E04434

VEGETABLES & FLOWERS FROM SEEDS

IN

TROPICAL, SEMI-TROPICAL, AND
TEMPERATE CLIMATES

PRINTED BY
SPOTTISWOODE AND CO. LTD., NEW-STREET SQUARE
LONDON

VEGETABLES AND FLOWERS FROM SEEDS

IN TROPICAL, SEMI-TROPICAL, AND TEMPERATE CLIMATES

BY

SUTTON AND SONS

Published by
SUTTON AND SONS
READING, ENGLAND

All rights reserved

PREFACE

EUROPEANS who, from choice or duty, dwell for a time in distant lands, experience a craving, nearly allied to home-sickness, for the vegetables of their native country; and health cannot be maintained unless this natural desire be met. Equally keen is the feeling provoked by the memory of familiar flowers. Although this may not be a question of health, but of sentiment, it must be acknowledged that sentiment has a very powerful influence for good or evil on the general well-being. Frequently it creates an intense longing to attempt gardening amid new surroundings and under strange conditions.

Happily it is possible to grow most of the productions of temperate climates in every country of the world. Exceptions there must be. No one who knows India will sow Borecole in the plains, although this vegetable has a high value on the hills. Nor will a resident in Rio de Janeiro expect Runner Beans to produce a crop. In the hot, steamy atmosphere of the tropics, some of the favourite flowers of British gardens become mere weeds; and it would be easy, by a number of instances, to show that certain vegetables and flowers cannot everywhere be grown with success.

Some knowledge of local conditions and the exercise of judgment will be necessary to avoid experiments that must inevitably end in disappointment.

Horticulture, as a serious pursuit, has all the fascination which belongs to things living. As a most delightful hobby it may by its absorbing interest become more than a mere pastime, while it brings a frequent reward in the pleasures of the table, and in beautifying the surroundings of a temporary home. Even the mistakes of the inexperienced will stimulate to renewed effort those who are capable of using failures as stepping stones to success. The following pages have been written in the hope of minimising failures, and of preventing the loss of time and waste of money they entail.

Sutton & Sons

THE ROYAL SEED ESTABLISHMENT,
READING, ENGLAND.

COPYRIGHT S. & S.

SUTTON'S EXHIBIT OF VEGETABLES AND FLOWERS AT THE ROYAL CALEDONIAN SHOW, EDINBURGH, FOR WHICH THE GOLD MEDAL WAS AWARDED

VEGETABLES FROM SEEDS IN TROPICAL, SEMI-TROPICAL, AND TEMPERATE CLIMATES

GLOBE ARTICHOKE

CYNARA SCOLYMUS

German, Artiſchocke. French, *Artichaut.* Dutch, *Artisjok.*
Spanish, *Alcachofa.*

COPYRIGHT S. & S.

IN cold climates the production of fine heads of Globe Artichoke is a somewhat costly process, and this vegetable becomes a luxury which cannot generally be indulged. But in countries having a distinctly warm summer, such as France or Italy, the cultivation of this plant is very profitable indeed. Under still higher temperatures the heads fail to develop and cease to be of value as an esculent. Globe Artichoke may then with advantage be transferred to the flower border, where the grand foliage has an imposing appearance, especially above a ground-work of Alternantheras, or in the company of plants which afford an effective harmony or contrast.

For edible purposes the culture of Globe Artichokes can only be recommended in tropical countries at an altitude exceeding 4,000 feet, and where abundant irrigation is possible. But as an ornamental plant it is entirely successful if sown in August at an altitude of 2,000 feet, and for the same purpose it may be sown in October near the sea level. The period for sowing seed in tropical countries, north or south of the equator, is from August until October. In Egypt, July and August ; in South Africa, Malta, Madeira, and the temperate zone of South America, September to December ; while in South Australia and New Zealand there are two sowing seasons, March and September. For the River Plate district of South America, February to July is suitable.

In China, Japan, and Canada, seed should be sown in April on a gentle hot-bed, or in May in the open ground.

A deep sandy soil, abundantly enriched with stable manure, is favourable to the plant, and the presence of salt is not prejudicial.

In hot climates a new plantation must be sown every year, but in temperate countries the plants are also of service in the second season. Even then it is sound practice to sow annually, and to break up the bed from which the second crop has been taken.

Artichokes should be raised by sowing seed on deep, very rich, friable soil. Sow in spring for autumn crops, and in late summer for those which are to be kept through the winter by the aid of dry litter and earthing up. Spring sowings need the assistance of a gentle hot-bed or cold frame wherever the season is backward. When large enough the plants are to be set out in lines four feet apart, and the same distance should be allowed between the plants in the rows. The intervening space can be utilised for Lettuce or other crops which occupy the ground for a short period only.

Chards are produced by cutting off Globe Artichokes in summer, and blanching the new growth by excluding light. When watered freely the young leaves grow rapidly, and are highly valued by many persons who care little for Artichokes.

JERUSALEM ARTICHOKE

HELIANTHUS TUBEROSUS

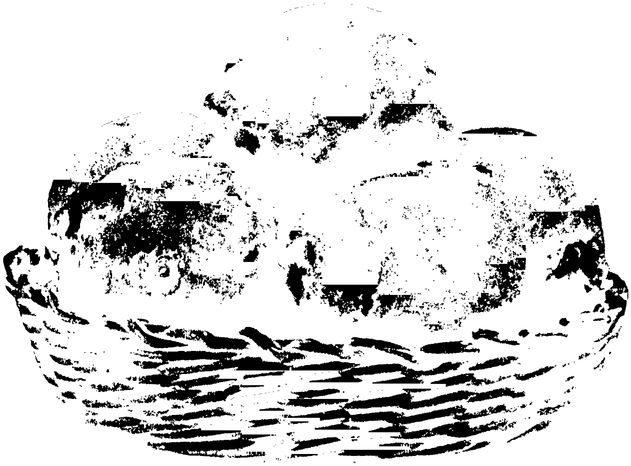
German, Artiſchocke. French, *Artichaut.* Dutch, *Artisjok.*
Spanish, *Alcachofa.*

THIS plant is not usually raised from seed, because the produce is smaller, more woody, and altogether inferior to the tubers grown from cultivated roots.

When properly cooked the Jerusalem Artichoke is not only a wholesome vegetable, with a distinct flavour of its own, but it affords the cook an opportunity of exhibiting skill in compounding delicious sauces and various white soups.

The culture of the Jerusalem Artichoke is practicable in all gardening climates except those where great heat and moisture prevail ; then the plant runs to stems and foliage instead of forming tubers. Any good soil is suitable except stiff clay. With free manuring it will thrive on poor sand, provided sufficient water be available.

The ground to be planted should be thoroughly broken up and liberally dressed with any manure at hand, supplemented, if possible, with a quantity of wood ashes. Plant in lines from 24 to 30 inches apart, allowing a distance of one foot between plants in the rows. Small tubers are suitable, or large tubers can be divided vertically in halves. The planting period varies from March to June. March is usual for temperate regions, and June suits all parts of India, Burma, and tropical Africa. The crop is ready for lifting at the close of the growing season, and the roots should be stored in earthenware jars filled with sand and made secure from rats.



COPYRIGHT S. & S.

To obtain satisfactory results, rainfall or irrigation equal to half an inch weekly is requisite during the growing period.

Tubers of Jerusalem Artichoke can only be exported from England in November and December.

ASPARAGUS

ASPARAGUS OFFICINALIS

German, Spargel. French, *Asperge*. Dutch, *Aspersie*.
Spanish, *Espárrago*.

On the warmer coasts of Europe and the northern shores of Africa, Asparagus is found growing in a wild state. Hence, in tropical countries and in British colonies, a wide sphere is open for the culture of this delicious esculent. The colossal sticks commonly served in Paris restaurants and occasionally seen in first-class London hotels are not to be expected in hot climates, because in the second year from seed the plants come into bearing and are soon exhausted. The only method of ensuring a regular supply is to sow down every year one or more beds to meet the demand.

Asparagus is a gross feeder, and in whatever country it may be grown the land must be light and rich. A sandy soil under irrigation, or subject to long-continued heavy rain, is difficult to maintain in the high condition which is necessary for ensuring a luxuriant crop. But where extreme temperatures are experienced, such as in Canada, Russia, Persia, and Afghanistan, Asparagus is easily grown and highly valued in spring when other vegetable produce is scarce or unobtainable.

The soil required is a deep loam, somewhat sandy in nature, and if impregnated with salt it will save the necessity of an annual dressing of this mineral. Most satisfactory beds can be made from alluvium taken from the mouths of rivers where tides meet the stream. Water in abundance must be available, and if it happens to be brackish, so much the better. Free drainage is imperative, as the plant cannot endure stagnation.

If possible, the land intended for Asparagus should be prepared one year in advance of sowing seed. Sometimes it is necessary to accomplish the work in six months, but a shorter period seldom yields a satisfactory return for the labour and outlay. Provide one ton of fresh stable manure for every hundred square yards. In digging, place the rough portion of the manure at least twelve inches below the surface, and the finer part should be incorporated equally in the soil. Seed of a green crop, such as Sunn, Crimson Clover, or Mustard, should then be sown thickly; while in growth this must be cut and dug in. For several reasons fresh manure is preferable to that which is decayed. The former is richer in the constituents on which Asparagus thrives; it is more reliable under irrigation, and there is less probability of importing the larvæ of the dung beetle, which in warm climates are very destructive to plants having succulent roots.

COPYRIGHT S. & S

Any soil known to be infested with strong-growing perennial weeds should be avoided for Asparagus, because the delicate roots are easily injured by the treading and digging which are unavoidable in extirpating weeds. Should the soil need salt, about twenty pounds should be evenly spread over every hundred square yards, and watering may be necessary to carry it into the soil.

April is the season for sowing in the temperate climates of the northern hemisphere, and August or September for the southern hemisphere. In tropical climates some judgment must be exercised in choosing the exact date, as great heat and moisture tend to the production of a weakly plant. Sow in drills 18 inches apart, arranged in pairs, with a 30-inch space between each pair of drills; this will give the requisite space for attending to the beds. The seed should be about an inch apart in the drills and be covered with an inch of soil. Thinning must commence early, and eventually the plants should stand about fifteen inches asunder in the rows. By raising the path between each pair of drills a barrier will be formed for controlling the irrigation water.

After sowing, sufficient water to keep the soil moist will be necessary at brief intervals until the plants are well established; then it should be given in greater quantity but at longer intervals. To maintain moisture without stagnation will require half an inch of water, either by rain or irrigation, once a week while the plant is rapidly growing. As the season of rest approaches, the supply can be gradually reduced until the stems dry, when they may be cut off, and a layer of leaves six inches thick will keep the bed cool and dry. In climates having a very low temperature during winter, a thick layer of stable litter will be necessary. This can be allowed to decay on the ground, and it will disappear in the process of weeding. In summer a dressing of salt will prevent the larvæ of insects from doing injury.

In India, Asparagus shows a tendency to start growth in the months of April and May, when there is no rain and the heat is great. As the arrest of growth may be fatal, every possible precaution should be taken to maintain the vigour of the plant.

When the beds are established they must be kept free from weeds by lightly touching the surface with a hoe, without putting a foot near the plants. Frequent dressings of fish-guano or other highly concentrated manures will aid the formation of good sticks, and the sweepings of salt-fish stores are especially beneficial.

The crop is gathered by cutting each stick which shows through the soil about six inches below the surface. A special tool, the Asparagus knife, is generally employed for the purpose, and to handle it efficiently needs care, or shoots which are not visible may be injured.

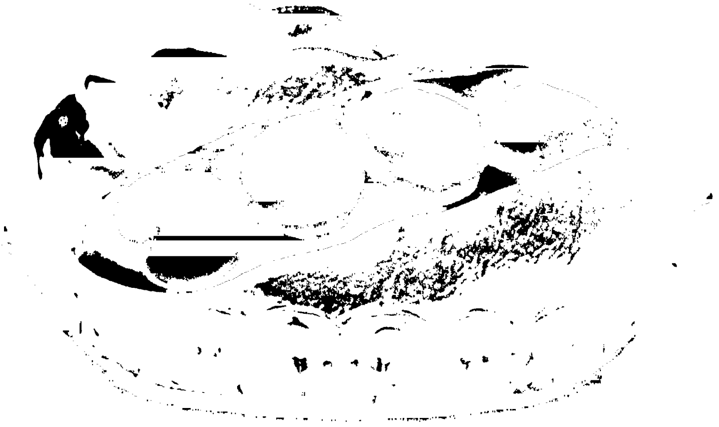
Blanching is much practised in Europe by excluding light from the early shoots of well-developed roots. The process augments rapid growth, and renders the shoots tender; but there is a general opinion that it impairs the flavour. In hot countries growth is sufficiently rapid without this stimulus; if blanching is preferred, it can be effected by covering the roots with nine or ten inches of soil and cutting the sticks before light has coloured them. Where the beds are shallow the rising shoots may be blanched by means of drain pipes, closed at the top with sods, and shaded from the sun.

As an ornament the feathery foliage of Asparagus is highly valued, and in climates where a temperature of 65° F. (19° C.) is regarded as fine bracing weather, it may be grown as a cold-season ornamental annual. In land strongly charged with salt, where other plants fail, there is nothing more charming. It may also be grown in pots for pedestals, or specimens can be sunk in the ground with the happiest results.

BROAD BEAN

FABA VULGARIS

German, Gartenbohnen. French, *Fèves de marais.*
Dutch, *Tuin of Boerenboonen.* Spanish, *Habas.*



COPYRIGHT S. & S.

The Broad Bean is not universally a favourite, but those who care for it manifest an almost passionate liking for the vegetable. Our countrymen carry this taste to other lands, and are persistent in their efforts to grow Broad Beans in tropical countries, where the yield is far more scanty than in temperate climates. The plants grow freely and flower profusely, but except in a few favoured places the flowers remain sterile, unless fertilised by insects or a camel's-hair pencil. Where the European Honey Bee, or some other insect, visits the flowers, there is no difficulty in growing Broad Beans.

In the United Kingdom and on the Continent of Europe, the crop is of necessity grown in all kinds of soil, including sandy loam. By means of heavy dressings of manure a fair return is obtained under conditions that are distinctly unfavourable. To see the plant at its best, however, it must be grown in a deep rich loam, inclining to the character of clay. In such a soil, well cultivated and freely manured, the vigour of the crop will astonish those who have only seen it growing on light land. The ground should be prepared months before sowing by deep digging and exposure to frost, or to great heat, which has much the same effect in disintegrating the soil and rendering it fertile. The operation offers the further advantage of exposing the eggs and larvæ of insects to the gardener's feathered friends, and it also destroys the mycelium of various kinds of fungus.

For tropical countries the sowing season ranges from August until October. Where the annual rainfall is less than forty inches the former month is applicable, and the later date to districts having a heavier rainfall. At an altitude of 5,000 to 7,000 feet, should water be available, seed may be sown during March or April. In South Australia and the Argentine Republic the months for sowing are May, June, July, and August; April, May, and June suit the southern portion of South Africa; November answers in Rhodesia; August for North Africa from Morocco to Egypt and the islands of Malta and Cyprus; October and November is the proper season for New Zealand.

The rows should be drawn two feet apart; this distance affords space for using the hoe and keeping down weeds. Three inches is the usual depth for dibbling the seed; the space between seeds in the rows to be from two to three inches. Should rats and other vermin leave the entire sowing to germinate, it may be necessary to thin the plants. This is so simple a task that it is wise to err on the side of thick seeding. To mend a deficient plant is generally difficult and sometimes impossible.

After sowing, should the soil be dry, one heavy watering must be given, and subsequently moisture can be maintained by frequent light waterings. When the plant is well established, from half to three-quarters of an inch of water, either from rain or irrigation, will be requisite weekly.

After the flowers have opened on about one foot of the stem, it is advisable to pinch out the top. This prevents further growth upwards, and concentrates the energy of the plant on a limited bearing space. The opinion that this procedure aids the filling of pods is perfectly correct when the flowers have been fertilised by insect agency or artificial means, but not otherwise.

DWARF FRENCH, or KIDNEY BEAN

PHASEOLUS VULGARIS

German, Buſchbohnen. French, *Haricots nains.* Dutch, *Witte boonen.*
Spanish, *Judias.*

THE French Bean is one of the most valuable and profitable crops grown in the kitchen garden. It is easily raised, and is prized the year through at the tables of all white races. Under favourable conditions as to soil, water, and temperature, there is no more satisfactory plant for tropical or semi-tropical countries, especially as it rarely suffers from the depredations of insects and is seldom injured by fungus. In a dry climate the chief foe of the Dwarf Bean is red spider, which is easily destroyed by regular and abundant supplies of water.

The list of useful varieties is somewhat lengthy, and they differ considerably in habit and fruitfulness. Several of the modern introductions are singularly attractive. When the pods are sent in fresh from the garden they are as pleasing to the eye as they subsequently are to the palate. On the exhibition bench no other vegetable presents a more tempting appearance.

None of the Dwarf Beans will endure cold, and the first touch of frost brings their career to an end.

During the reign of Queen Victoria the head gardener at Frogmore, near Windsor Castle, was always prepared to supply the Royal table with this vegetable through the most inclement weeks of winter, and in many famous British gardens it is usual to maintain a continuous supply of Dwarf Beans for the entire circle of the seasons. This, of course, necessitates culture under glass during the months when cold nights prevail. Should the temperature fall below 50° F. (10° C.) the plant does not prosper. ·

COPYRIGHT S. & S.

The most suitable soil is a rich deep loam, which has been liberally manured for the previous crop. While the plants are young, and before the roots are fully developed, the soil must be kept moist by frequent applications of water. As the period of bearing approaches more water is necessary, but it may be given at longer intervals. Should the leaves begin to turn yellow, it is an indication that the soil is poor and needs occasional assistance with liquid manure, which must not be too strong.

For India, Burma, South Africa, Abyssinia, and the West Indies, at places having an altitude of 2,000 feet, and with irrigation available, the sowing season commences in May; main crops are put in about the middle of June, and sowings are continued fortnightly until December. Where the rainfall exceeds 70 inches during the four months of the rainy season, sowing must be deferred until August, and the seed should be planted on ridges, well raised, to ensure efficient drainage. In the northern provinces of India, where temperature at night falls below 50° F. (10° C.), a position sheltered from the north-east wind must be selected. A breeze from the direction named causes rapid evaporation and produces intense cold. Under such conditions it is easy to manufacture ice by pouring water into shallow vessels, covering them with wet straw and exposing them to the influence of the keen drying wind. For this reason plants should not be watered overhead in the evening, or they will inevitably suffer injury.

Throughout the winter in Egypt, Dwarf Beans are brought into bearing under glass; successional crops are raised in early spring under the shelter of mud walls. From April onwards, with the aid of irrigation, crops are produced during the entire summer.

From September until February, French Beans are sown fortnightly in South Australia, and the Climbing varieties in

September, October, and November, protection being afforded to the early crops.

Sowings are made in Queensland during July, August, and September; and in New Zealand, in sheltered positions, from October until the end of December.

In Canada, sowings commence in April under protection, and are continued in the open during May and June.

For the hot climates of Central America, the regular sowing period is August and September; in the temperate climates of South America, October is the usual month; from June to December suits the Argentine Republic.

In Brazil, the sowing season for Haricots begins in December and ends in May; but in Bahia, March is the earliest, and July the latest date for safe sowing. On the coast of Brazil, extending from South Bahia to São Francisco Valley, from January till May is a favourable sowing season.

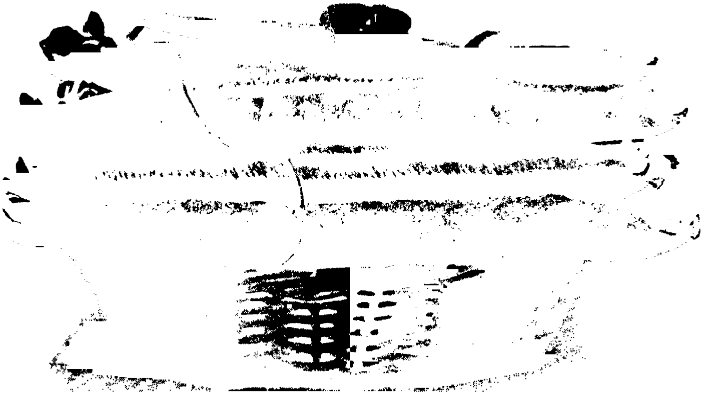
To no other country is the crop of Dwarf Beans of such vital importance as to Guatemala, where Haricots and Maize form the staple food of the people. In the *tierre templada*, with an altitude of 1,300 to 4,900 feet, a mean rainfall of 54 inches per annum, a minimum temperature varying from 41° to 45° F. (5° to 8° C.), and a maximum temperature ranging from 84° to 87° F. (29° to 31° C.), two crops are grown annually, and the sowing season extends through seven months, from May to November inclusive. This indicates very clearly the most favourable climatic conditions for complete success in growing French Beans. Still, a highly satisfactory result is obtainable from this crop in all warm or mild climates, although the warm season may alternate with a period of very low temperature, as in Canada.

For many years past experts have been engaged in the attempt to secure new strains possessing the character and quality of true French or Kidney Beans, on plants having the climbing tendency, and their labours have been crowned with remarkable success. There are now in existence several excellent varieties which yield a profusion of pods, similar in appearance, and equal in quality, to those grown on plants of the dwarf section. This new climbing class offers the advantage of an increased crop from a comparatively small area of land. The culture is in all respects the same as that which suits the Runners, but the Climbing French varieties do not need quite such tall stakes.

RUNNER BEAN

PHASEOLUS MULTIFLORUS

German, Stangenbohnen. French, *Haricots à rames*. Dutch, *Klimboonen*. Spanish, *Judias enredaderas*.



COPYRIGHT S. & S.

THIS excellent vegetable is welcome on the tables of the wealthy, and it is emphatically the poor man's delicacy. In the United Kingdom the plant is universally grown as a tender annual in gardens great and small. It requires no ingenuity to give the crop an ornamental character, by using wire arches, or planting in groups at regular intervals down the sides of paths.

On all cultivated soils the Runner Bean grows freely, and yields a fair return for the labour and attention bestowed upon it; but, like most other occupants of the kitchen garden, it produces the best results in a deep, well-tilled loam, abounding in lime. The seeds are usually planted in lines five feet apart, and they may be inserted separately at a distance of about two inches in the rows. Thinning to four or six inches is necessary, unless the depredations of vermin save the trouble and perhaps render transplanting imperative. A separate group should always be raised for this purpose. The plants can be kept dwarf by constant pinching; under this treatment they cover the soil and conserve the moisture. As a rule, however, it is usual to afford stakes five or six feet high; the points which seek to go higher are nipped out. It is sound practice to allow this and other Bean crops to follow Cauliflower, Celery, Cabbage, or Potatoes, for which heavy dressings of manure were applied.

Several varieties have recently been introduced which are far more prolific in warm countries than the old Scarlet Runner. Experience has shown that these improved strains are sufficiently strong in constitution to yield an abundant return at an altitude of 2,000 feet or more in tropical climates, when planted from July till October; or at an altitude of 5,000 feet if sown in April and water be available.

September, October, and November is the sowing period for Southern Australia; the end of October for New Zealand, and the same date is suitable for Egypt, Morocco, Malta, and South Africa. From June to December is the sowing season for the Argentine Republic and adjacent districts of South America.

In mild climates with abundant rain, the plants when about eight inches high are earthed up before staking; but in hot countries earthing is not an advantage, and irrigation equal to half an inch of water once a week is necessary, unless rain falls to that extent.

GARDEN BEET

BETA VULGARIS

German, Runkelrübe. French, *Betterave potagère.* Dutch, *Roode Beet.*
Spanish, *Remolacha.*

COPYRIGHT S. & S.

Of all the European vegetables which are grown in tropical and semi-tropical climates, it is questionable whether any one of them is more valued than the Garden Beet. With ordinary care the crop can be grown of the finest quality, and may be maintained in good condition during a longer period than other vegetables. In many countries the roots are procurable the year through. When properly cooked and served they are greatly appreciated at table, either alone or as a component of cool and delicious salads. In the course of preparation the knife should be unknown. The cook should simply twist off the leaves and stalks, wash the roots quite free from soil, perhaps pinching away a few small fibres. The roots should then be boiled whole, with an unbroken skin. When cold they can be served in any manner most acceptable, with the splendid crimson sap and the flavour fully retained.

During the hot and wet months of June and July, Beet cannot be grown at the sea level in all the tropical climates of the northern hemisphere; but at an altitude of 2,000 feet, with rainfall not exceeding ten inches per month during the four rainy months, the crop thrives, and in November success may also be obtained down to the sea level.

The most suitable soil for Beet is a deep, rich, cultivated loam, which has been generously dressed for the preceding crop. A direct application of manure, especially if fresh or raw, is injurious, resulting in fanged roots which are almost worthless. Should it be actually necessary, let the stuff be buried at the bottom of the trench, so that only the main tap root and lower fibres will reach it. The shapeliness of the roots will not then be impaired, and it is important that in any case the manure should be free from the spores of the slime fungus. Should there be a doubt on this point a bushel of quicklime mixed with a cartload of manure will destroy the slime fungus and increase the value of the dressing. On a light sandy soil the crop may be assisted with water to which some good artificial manure has been added. Fish guano, potash, and salt are all suitable for Beet, and a mixture may be used at the rate of twelve pounds per hundred square yards.[1]

---

[1] In tropical countries a superior guano may be made from fish of inferior quality, dried by being spread on the rocks in full sunshine. When ground and mixed with wood ashes this is rapid and certain in its effects.

The sowing season for the Deccan begins in April, and should be continued at intervals of fifteen days until the end of the season. Select a plot to the south of a plantation of Bananas or other tall-growing plants, which will afford shelter from the north-east winds; but the seed-bed must be at a sufficient distance to admit abundant light and air all round. A light shading material may be stretched over the bed at a height of three feet from the ground.

Seeds should be sparingly sown in lines one foot asunder. Thinning may be necessary, but as the roots will be of service when they attain a circumference of four or five inches, perhaps the young Beets can be utilised by gradually reducing the plants to a distance of about eight inches in the rows. Sometimes an attempt is made to transplant Beets, but the labour is generally wasted, especially on early crops. While the plants from the first sowing are developing, half an inch of water every alternate day will be requisite.

The succeeding crop is sown in the middle of June, after rain has cooled the surface soil, and while the sky has occasional clouds. Sowings may be repeated until January. For these crops it will be necessary to increase the distance between rows to eighteen inches, but in the lines plants may be left about nine inches apart.

On the southern shore of the Mediterranean, Beet may be sown monthly from August until March, and the same period is suitable for South Africa, South Australia, and the temperate districts of South America. In Canada and China April is the sowing month, and in these countries it is wise to sow seed on ridges to avoid damage to the plants from excessive moisture. On the hills of India, at an altitude ranging from 4,000 to 7,000 feet, Beet should be sown monthly, commencing in March, and at the higher altitude slight protection from cold must be afforded in the first month. The sowing season for the West Indies depends on the altitude, as in India.

Beet does not suffer so much from insect pests as the Cabbage tribe, but Aphis is at times extremely injurious. The best remedy is a kerosene emulsion, which is easily made by dissolving as much soap in hot water as the water will absorb. When cool, add an equal quantity of kerosene oil and churn thoroughly. This emulsion can be diluted with thirty times the quantity of fresh water, sprayed over the plants by means of a syringe.

In South Africa and elsewhere a peculiar condition of soil exists, needing special treatment to prepare it for a crop of Beet that is to be grown without irrigation. The soil referred to consists of loose sand resting on a retentive subsoil. The surface soil contains sufficient moisture to germinate the seed, while the subsoil is soaked with water from rain which has fallen weeks before. If rain does not come opportunely after seed has been sown, the young plant fails to get down to the damp subsoil, and the water cannot rise to the plant by capillarity as it does in denser land.[1] Repeated rolling after sowing is the best remedy, and the trampling of a flock of sheep, driven slowly over the ground several times, has proved successful by increasing the density of the sandy surface and enabling it to draw moisture from the lower store.

Silver Beet is grown for the sake of its leaves only; the roots are of no value. The midribs of the leaves are strongly developed and extremely succulent. These midribs are stripped from the leaf, and are cooked and served in the same manner as Asparagus. The remainder of the leaf is treated as Spinach. It is usual to pull the leaves from the plants, because cutting involves a loss of sap. The crop needs a rich soil and it is greatly assisted by occasional applications of liquid manure.

---

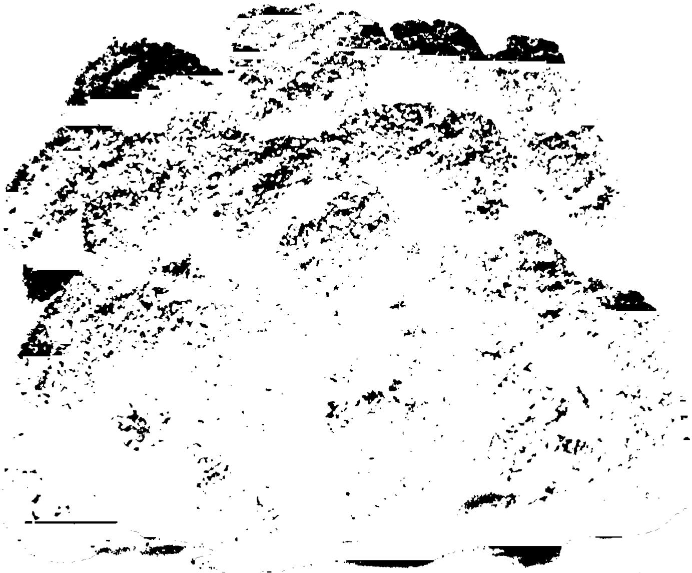
[1] Baron Liebig, in his 'Natural Laws of Husbandry,' thus describes the action of water in a state of motion:

'If we regard the porous earth as a system of capillary tubes, the condition which must render them best suited for the growth of plants is unquestionably this: that the narrow capillary spaces should be filled with water, the wide spaces with air, and that all of them should be accessible to the atmosphere. In a moist soil of the kind affording free access to atmospheric air, the absorbent root-fibres are in most intimate contact with the earthy particles; the outer surface of the root-fibres here may be supposed to form the one, the porous earthy particles the other wall of a capillary vessel, the connection between them being effected by an extremely fine layer of water.'

BORECOLE, or KALE

BRASSICA OLERACEA ACEPHALA

German, Winterkohl. French, *Chou frisé*. Dutch, *Boerekoole*.
Spanish, *Bersa rizada* or *Breton*.



COPYRIGHT S. & S.

THE special value of this Brassica can only be realised in regions where frost is common during the winter season. Borecole is capable of enduring a very low temperature, and is none the worse for being severely frosted. In fact it is one of the few crops which successfully withstand the cold and mists of the Falkland Islands, where it is grown on land heavily dressed with manure from flocks of sheep.

For tropical and semi-tropical climates Borecole is of little value, except at altitudes where the conditions of a temperate climate prevail. In warm districts other vegetables such as Cauliflower and Kohl Rabi are cultivated with greater advantage.

In northern temperate climates many varieties of Kale are grown, differing in height, colour, and general appearance. Some of them have foliage so beautifully crisped and curled as to be quite suitable for garnishing, and it is frequently employed for this purpose. Occasionally the smaller purple leaves are also used with most pleasing effect in decorating the dinner table. The importance of the crop is manifested during winters of exceptional severity, when other occupants of the kitchen garden are simply annihilated. Then the Borecole asserts its true worth by supplying successive dishes of almost priceless value.

Of all the Brassicas the Borecole is least particular as to soil. This characteristic materially enhances its usefulness in many regions where other vegetables are impossible during the cold season. On hard rocky land the plant yields a welcome dish of greens, even when the hardy Sprouting Broccoli has suspended its useful service. Still, for this, as with other crops, a good soil is always preferable to a bad one, and if it happens that the Kales can be put on a well-tilled clay, they will revel in it and produce a grand sample.

It is important to give all the varieties a long season to mature. Seed must therefore be sown in spring. The usual time to begin is March, and another sowing is made in April, on a prepared seed-bed in a very open situation. Thin sowing is essential, and it should be in rows, far enough apart to permit attention being given to the bed without injury to the plants. Crowding must never be allowed ; when large enough the plants ought to be pricked off once, at least six inches apart, to keep the growth short and robust. In due time transplant to final quarters. If this cannot be done during showery weather water must be freely given. As to space, allowance ought to be made for differences in habit, and also for the character of the soil. For the dwarfs eighteen inches will generally suffice, but the tall kinds may need two feet or more to do them justice.

In the temperate regions of the southern hemisphere, and at high altitudes in the tropics, the same method can be followed, but the time of sowing must be altered to the months which correspond with spring in the United Kingdom.

BROCCOLI

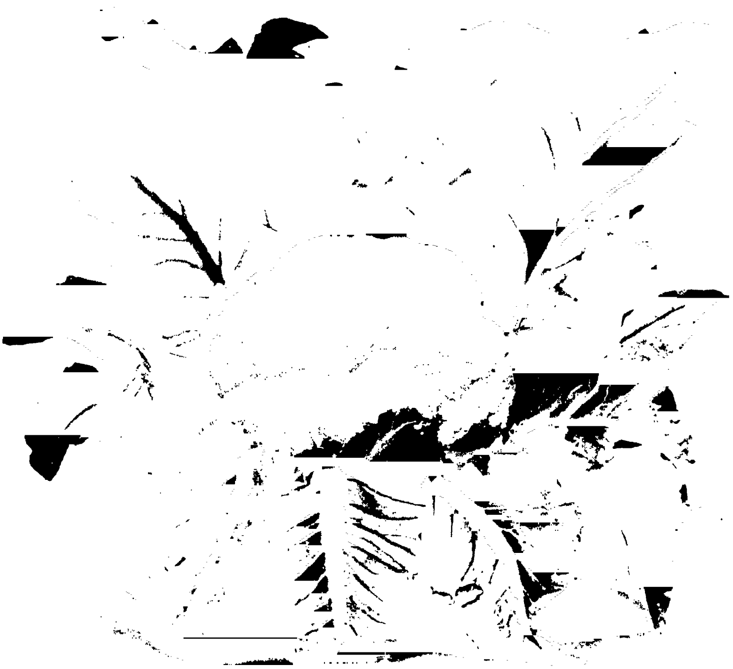
BRASSICA OLERACEA BOTRYTIS ASPARAGOIDES

German, Broccoli. French, *Chou Brocoli.* Dutch, *Brocoli of Aspersikool.*
Spanish, *Bróculi.*

FROM a well-managed garden in the United Kingdom, a continuous supply of Broccoli or Cauliflower is sent to the table during every month of the year. The two plants differ chiefly in the endurance of cold. Broccoli is the hardier, and takes more time in maturing heads than Cauliflower ; some varieties of the former needing more than a year to attain perfection. It will therefore be inferred that for hot countries generally the Cauliflower should have preference over Broccoli, although there are districts where the latter thrives remarkably well. For example, on the plains north of Calcutta, where the dry night winds are sufficiently cold to produce thin ice on irrigated land, Broccoli is a valuable crop and the white varieties are sold as Cauliflower. In other districts it may be worth while to ascertain by a series of experiments whether it is possible to grow Broccoli with advantage.

Some varieties may succeed where others fail, and several of the early, medium, and late classes should be grown side by side. This vegetable is far too valuable to be neglected where it can be cultivated with a fair prospect of success.

A deep, rich, and rather tenacious soil is imperative for Broccoli, but the seed-bed must be both rich and friable, or the plants cannot be lifted for transplanting without injuring the small root-fibres. The method of making a puddle of lime, soot, old manure, loam and water, into which the roots are dipped before the final planting, has proved to be such an excellent plan that Broccoli should have the benefit of it. The treatment is of real advantage to all the Brassicas.



COPYRIGHT S. & S.

So far as sowing and management of the seed-beds are concerned, the treatment of Broccoli and Cauliflower is identical up to a certain stage of growth. Beyond this point the difference between these two Brassicas must be borne in mind in order to secure the most satisfactory results from both. The details given under Cauliflower as to sowing, pricking off the plants, and the necessity of ensuring dwarf sturdy growth are applicable here. But the Cauliflower is a summer and early autumn vegetable, unable to withstand inclement weather, while the Broccoli is capable of supplying the table during autumn, winter, and spring.

Seed of autumn Broccoli is sown early in the year under glass, and it is usual to follow with a sowing in the open on a well-prepared seed-bed. These sowings should secure a succession of delicate heads for nearly three months. The autumn section is followed by the winter varieties, for which seed is sown in April. Later in the same month and also in May sowings are made of the spring and early summer Broccoli. Here it must be admitted that results largely depend on the character of the winter. A succession of mild days, combined with a few hours of sunshine, start the sensitive plants into premature growth. But taking the average of seasons, the varieties which have, during a long term of years, been selected to stand dormant in frosty weather and furnish heads to the end of spring or beginning of summer, generally come in at the time they are wanted. Thus, for the entire cycle of the seasons, a continuous supply of Broccoli and Cauliflower is maintained, excepting perhaps a slight break caused by neglect or unusually severe frost.

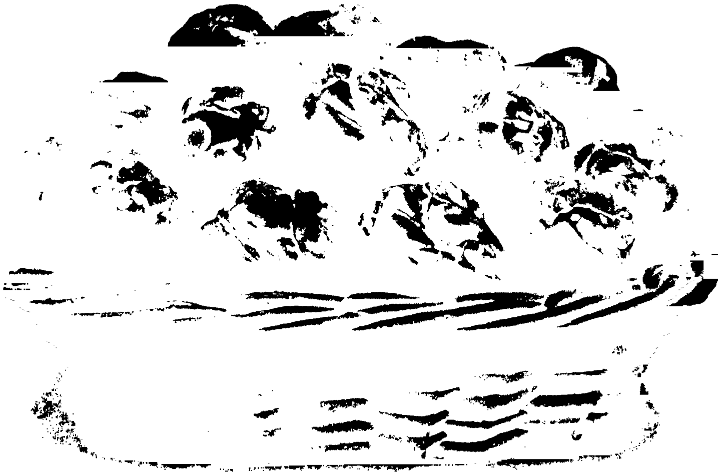
For all countries where the climatic conditions are favourable the same course of procedure is available, making due allowance in every case for the usual sowing period.

On the question of size it is worthy of remark that growers for market too often aim at the production of large showy heads. For private tables rather small heads, close, firm, and delicately white, are always held in highest esteem.

BRUSSELS SPROUTS

BRASSICA OLERACEA BULLATA GEMMIFERA

German, Roſenkohl. French, *Chou de Bruxelles.* Dutch, *Spruitkool.*
Spanish, *Repollitos* or *Col de Bruselas.*



COPYRIGHT S. & S

Of all the Cabbage tribe Brussels Sprouts command a greater degree of favour than any other form of Brassica. As a vegetable the sprouts are tempting in appearance, excellent in flavour, and they are acceptable at tables where the coarser kinds of Cabbage would scarcely be countenanced. The plant is grown to perfection in European countries and the United States, and it needs a long season to attain maturity, without excessive heat or cold. The best varieties form dense buttons, moderate in size, closely packed on the stems from bottom to top. In their season the demand for these sprouts is large and constant. The loose head is accounted of little value.

Brussels Sprouts can be recommended for culture in Egypt, the Himalayas, the Nilgiri Hills, the Cape, Transvaal, Azores, St. Helena, and the higher altitudes of the West Indies and Brazil.

Seed should be sown at the beginning of the growing season, and for the first supply of buttons sowings may also be made towards the end of the season, provided the winter temperature does not fall below 10° F. (—12° C.) and that the young plants can be safely kept over from autumn until spring.

It is useless to attempt to grow this crop on poor, exhausted land. A strong rich soil is necessary, and the lodgment of water during the cold season must be prevented. While the plants are growing they will require half an inch of water weekly, in the form of either rain, dew, or irrigation.

CABBAGE

BRASSICA OLERACEA CAPITATA

German, Kopfkohl. French, *Chou pommé.* Dutch, *Sluitkool.* Spanish, *Col.*

PROBABLY no vegetable garden in the United Kingdom is destitute of an annual plot of Cabbage. The lowliest cottager cannot dispense with a crop which is reliable, profitable, and wholesome ; and in gardens which supply the mansions of the wealthy it is equally necessary. An unexpected demand for vegetable dainties, or the failure of crops in severe seasons, may at once necessitate a call on so trustworthy a resource as Cabbage. Every year the area of its culture extends, and as an article of food and merchandise the plant is winning its way among the conservative peoples of the East. In their markets large quantities are on sale for the use, amongst others, of sea-faring men, who have discovered its antiscorbutic properties, and who have also learned by experience that, as a provision for the crews of ships, it can be kept in good condition for a considerable time at sea.

To enumerate the countries and districts where Cabbage can be profitably grown would necessitate a list of nearly all the habitable portions of the world in which gardening is practised, except a few hot and moist climates where, during the rainy season, it is useless to attempt the culture even of this hardy and accommodating plant.

COPYRIGHT S. & S.

Here it is advisable to state that the strong odour which renders certain kinds of Cabbage objectionable in Europe is not so pronounced in hot countries. Another point in favour of the plant is the fact that under a tropical sun Club or Anbury is much less destructive than in cool climates.

The soil in which Cabbage especially flourishes is a fertile loam, rather tenacious in texture, but not so adhesive as to become water-tight on the surface after rain. Some soils which have this tendency, though in other respects well adapted for the crop, may, when digging the land, be rendered suitable by the free addition of town sweepings and fresh manure. Leaving the soil rough, and frequently breaking the crust with the hoe, are aids in the same direction, by affording free access to the air and the rain. Merely to provide channels for the escape of surface water does not meet the desired end. When the top soil has become impervious under heavy showers, the roots of plants may actually be suffering from want of water. In such a case the best remedy is to drive a bar through the top crust at short intervals all over the plot.

Land intended for the seed-bed must be in an open position, entirely free from the possibility of rain dripping from trees. Mark off a space of about sixteen feet long by nine feet wide; cover the entire surface with garden sweepings and refuse, which must be slowly burned. Then cut in the centre of the plot a bed ten feet long by three feet wide, and on this space lay down two inches of decayed manure; dig repeatedly to ensure a friable condition, level carefully, and make a finely crumbled surface on which the seed can be thinly sown; finish with a light touch of the rake to cover the seed, and water freely. This arrangement will give a seed-bed, surrounded by a border of unbroken ground, covered with ashes, about a yard wide. The fire will have destroyed many eggs and larvæ of insects, and the odour of burned material on the border of ashes renders the bed additionally safe.

Notwithstanding all these precautions, it must unfortunately be admitted that the seedlings are liable to attack from a host of enemies, and during the early stage these enemies are a constant source of anxiety. But to secure strong plants for setting out is a great point gained. In some cases it may be wise to double the size of the seed-bed, and to mix with the seed Carrot or Fennel. The odour of these two plants appears to be a deterrent to certain insect foes.

Even then the kerosene emulsion described on page 20 may be necessary to save the sowing. Over a large area the syringe must be employed, but on a small bed the bottle used for spraying scent is effective. It must, however, have a bulb, because the Hindoos wisely refuse to use their lips for the purpose.

Rapid evaporation may to some extent be prevented by lightly smoothing the soil with the back of a spade, or some other suitable implement, and it will be necessary to mitigate the fierce rays of the sun by stretching material over the bed to afford shade.

When the seedlings have attained two pairs of leaves, water should be given carefully, and if the plants are too thick in certain spots they can be tenderly lifted and transferred to another bed, allowing a space of four inches apart each way. The unwise method of pulling plants from seed-beds, which is too often practised in temperate countries, should not be adopted in the tropics. The seedlings must be raised with every fibre intact, and the roots are not to be allowed to become dry. They should be covered and kept moist until transplanted ; shade is also requisite until they are established.

The process affords an opportunity of separating the plants into different sizes. The larger seedlings to be transferred direct to permanent quarters, in rows two feet apart, allowing a distance of 18 to 24 inches between the plants in the rows. The smaller seedlings to be replanted on a prepared bed about 4 inches asunder until these also are ready for the final beds.

The shock of transplanting may be tempered by puddling each hole with a thin mixture of rich soil, cow dung, and water. It is still better practice to make a puddle of lime, soot, rich soil, manure, and water, and in this dip the roots before planting, as advised under Broccoli.

CABBAGE

COPYRIGHT S. & S.

The permanent beds should be prepared for Cabbage by giving a dressing of one ton of farmyard manure, or decayed town sweepings, to every hundred square yards; or ten hundredweight of poudrette can be given while the ground is being broken up, and five pounds of dry fish in powder should be used on the same area when planting the Cabbage. Whether the ground be dug or ploughed, it should be left in ridges measuring two feet from centre to centre. The plants can then be set in the furrow or on the ridge, as best suits the rainfall. In the rows the distance between the plants should be determined by the size of the variety. Cabbages planted out in dry weather need to be watered individually by hand. In tropical countries irrigation equal to half an inch of water every third day will be requisite for the first month; subsequently an application of one inch per week will suffice.

For the early crop in the tropics it is always desirable to secure plants that have been raised at a higher altitude. For instance, in the neighbourhood of Bombay an exceedingly rich soil has been formed by filling swamps with sweepings of the city. In November young Cabbages, which could not be reared in Bombay, are brought from an altitude of 2,000 feet, and planted on this land with entire success.

The season for sowing Cabbage seed is August, September, and October for the plains of India, Burma, Central Africa, and the West Indies, adopting the later months where the rainfall is great. The same period suits the hills—the earliest month with shelter from heat, and the latest month on poor soil with shelter at night until snow comes. Plants from late sowings are ready for transfer by the time the ground is workable in spring.

In South Australia, Cabbage seed is sown every month of the year, except April and May—the maincrops in June on beds of rather poor soil to produce hardy plants. In New Zealand sowings are made every month except June and July.

August and September are the months for sowing main-crops in Egypt, but to maintain supplies a little seed may be sown every month except in the height of summer.

The sowing season for the hot countries of South America depends much on altitude. September suits the sea level, and March when the elevation exceeds 3,000 feet. The two months named may be regarded as central dates.

For the temperate climates of South America, where the Apple tree grows luxuriantly, the usual months for sowing Cabbage seed are August and September, on well-manured seed-beds; February and March on poorer soil to furnish plants that will stand through the cold months without showing a disposition to run to flower in September; those which are too forward are almost certain to start seed-stems.[1]

Late sowing is important, but the choice of varieties is of equal consequence. Certain sorts of Cabbage, when sown at the proper period—which is August for the United Kingdom—show no tendency to bolt in spring, whereas other varieties, which are of real service for spring sowing, cannot be relied on when sown in autumn.

Red Cabbage requires a much cooler climate than other sorts. The planting may be closer, and the soil must be in very excellent condition to do the crop justice. But the cultural details do not differ from those which are successful for other types of Cabbage.

Couve Tronchuda, or **Portugal Cabbage.**—This is a delicious vegetable, and the plant thrives in warm countries under the same treatment as ordinary Cabbage. It is chiefly grown for the mid-ribs of its great leaves; when these mid-ribs are treated in the manner usual with Sea Kale they are of high quality.

---

[1] The premature bolting of Cabbage in spring is dealt with fully in Sutton's book on British Gardening, entitled 'The Culture of Vegetables and Flowers from Seeds and Roots.'

Couve Tronchuda forms a conspicuous object in the flower garden when planted in combination with Globe Artichoke. The ground can be covered with such plants as Red Amaranthus, Verbena pegged down, or dwarf Phlox Drummondii. For flower beds or borders, Portugal Cabbage should be raised in pots and be transferred when the plants have attained a considerable size.

SAVOY CABBAGE

BRASSICA OLERACEA BULLATA

German, Wirſing. French, *Chou de Milan.* Dutch, *Witte-kool.*
Spanish, *Repollos de Milan.*

COPYRIGHT S. & S.

THE Savoy Cabbage is essentially a winter vegetable, and its great usefulness is only realised in countries subject to frosts during the cold season. Several excellent varieties are available, some of which are ready for cutting in autumn, while others prolong the supply through the winter. On a small plot of land Savoys produce a surprising quantity of wholesome food, and after a severe frost the quality of this vegetable is much improved. Market gardeners show a preference for large heads, which are eagerly sought by the public. For private gardens, however, the smaller varieties are not only more tempting in appearance, but far superior in delicacy of flavour.

The culture of Savoys differs from that of Cabbage in one important particular. Cabbage seed is sown both in spring and summer—the latter is generally miscalled autumn sowing. Of the two the summer sowing is of greater service. But Savoys are sown in spring only. The earliest is generally made in a frame some time in February; after the beginning of March it is usual to sow on open beds. The number of sowings must be regulated by the demand, but two or three suffice in the majority of gardens, and it is useless to put seed in later than May. Although Savoys will yield a more profitable return from comparatively poor land than most vegetables, the soil which suits them best is a deep rich loam, rather inclined to be retentive. For the seed-bed a somewhat lighter texture facilitates the transfer of the plants, but this also must be in good condition, because starved soil gives a bad start, and the effect of it is too often visible in the mature crops. As with Cabbage, the seeds should be sown thinly in rows, and the young plants must be pricked off before crowding does harm. Choose moist weather, if possible, for planting out, or be prepared with a supply of water to prevent flagging.

The months named for sowing suit northern latitudes. For the southern hemisphere the only alteration necessary is a change of dates. The Savoy can scarcely be recommended for warm countries, and in the tropics, near sea level, it certainly is not profitable. But on the hills, where frost is not unknown, in many districts this hardy Brassica may be grown with advantage.

CAPSICUM AND CHILI

CAPSICUM ANNUUM: CAPSICUM BACCATUM

German, Spaniſcher Pfeffer. French, *Piment.* Dutch, *Spaansche peper*
Spanish, *Pimientos.*

COPYRIGHT S. & S.

As Capsicum and Chili are both tropical plants they are easily grown without special care in warm climates on any fairly good garden soil. For green Chilis seed may be sown at all seasons if water be available; but to ripen Chilis for preserving, seed is sown in India, Burma, Central Africa, and the West Indies about the middle of the rainy season—that is during August. A well-manured seed-bed should be prepared, and when the seedlings are four inches high, they can be transferred to permanent quarters in lines two feet apart, with a spacing of eighteen inches in the lines. A few waterings may be required after the rains have ceased, but no water is given while the fruit is ripening. Where irrigation is possible the sowings may be made much later.

In Southern and Western Australia sowing begins on a hot-bed early in September, and is continued in the open during October. The month last named suits New Zealand, but the protection of glass is necessary, and a specially sunny aspect. For South Africa, August is the proper month in warm positions; September and October for the open. March and April are the usual months for sowing in Egypt, Malta, and Madeira, but in these countries the season may be greatly extended with the aid of protection. In the Argentine Republic and neighbouring districts, seed is sown under glass from June to September.

CARDOON

CYNARA CARDUNCULUS

German, Spaniſche Artiſchocke. French, *Cardon.* Dutch, *Spaansche artisjok.*
Spanish, *Cardon.*

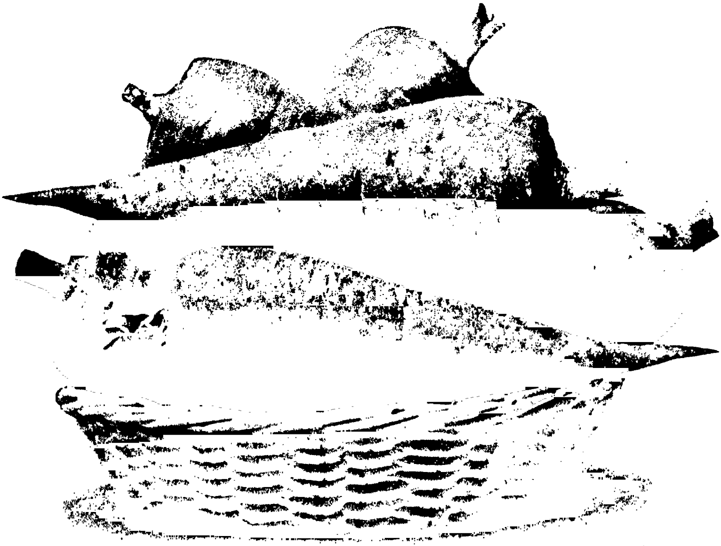
THIS vegetable is nearly allied to the Globe Artichoke, and thrives under similar conditions, but the blanched leaves are the edible part. The process of blanching stems and leaves is the same as for Artichoke Chards.

The dried flowers are used for coagulating milk.

CARROT

DAUCUS CAROTA

German, Möhre. French, *Carotte.* Dutch, *Wortels of Peen.*
Spanish, *Zanahoria.*



COPYRIGHT S. & S.

THE Carrot is not only an important crop in every vegetable garden, but the varieties differ widely in form and are adapted to meet diverse tastes and varied conditions of soil and climate. For the long-rooted section a deep sandy soil, thoroughly tilled to a depth of eighteen inches, is imperative; but for the short varieties a few inches depth of fine loam will suffice. Between these extremes there is the intermediate class, that can be grown with success in the great majority of gardens, and this class includes roots of the highest table quality.

In the culture of Carrots, no matter what may be the favourite form, one important principle must never be forgotten or neglected. The application of fresh manure always tends to the production of fibres and fangs. These not merely spoil the shapeliness of the roots, but they reduce the edible weight of the crop. The thoughtful gardener will always partially prepare the land for Carrots a year in advance, by giving rich manure in abundance for the preceding crop. This treatment saves the necessity of dressing the plots in the year Carrot seed is sown. The soil must be thoroughly well tilled, broken fine, and made friable throughout, whatever the depth may be ; the roots will then be clean, excellent in form, and a credit to the grower.

Carrot seed should everywhere be sown in lines, the distances varying with the character of each variety. For the short early sorts six inches will suffice, and the spacing may be increased up to eighteen inches for main crops of the longest kinds. The question of thinning is worth consideration. It must be done sufficiently to keep the crop in free healthy growth, but instead of thinning to the final distance in one operation there is a decided advantage in performing the task by degrees. This method furnishes frequent dishes of tender little roots, which are much prized at table. The process can be continued until the plants stand at their proper distances for maturing.

As a garden crop in tropical countries the Carrot may be sown at any season in which there is neither frost nor continuous heavy rain. In India the change from the rainy to the cold season occurs in September and October, and is usually marked by thunder-storms, accompanied with heavy showers. On a soil previously saturated with water in its lower strata, the moisture, with the aid of dew, is generally sufficient to bring a crop of the short rooted Carrots to maturity. It must, however, be clearly understood that in the absence of moisture this root will cease to grow, as does any other crop, and the tap-root, however deep, will not save it.

In specially hot, dry weather, shade of some sort is required from the noonday sun, and it should be so contrived as to be easily removable in the evening, when a copious watering may, if necessary, be given in addition to the heavy weekly irrigation. Under such conditions the regular production of the best varieties of Horn Carrot for table use may be continued throughout the hot season, except in places near the sea level which are not visited by refreshing breezes. The usual sowing period includes September, October, and November; during those months fortnightly sowings are advisable to ensure a continuous supply. Probably the most satisfactory result will be obtained from seed put in about the middle of the period named. If practicable there is an advantage in having the ground laid out for irrigation, especially as at the end of the sowing season good crops may then be raised.

COPYRIGHT S. & S.

CARROT

The Carrot has few enemies in tropical countries. The regular use of wood ash as manure probably keeps off the Carrot fly, and a liberal application in the drills before Carrot seed is sown is recommended as a preventive of the depredations of the maggot in other countries.

On the subject of insect pests generally, it is well to bear in mind that an ordered rotation is a marked advantage to all crops. The constant turning of the soil affords birds an opportunity of searching the ground for the grubs and bots that feed voraciously on garden crops.

For Egypt and other countries immediately south of the Mediterranean, October is the sowing season for main crops of Carrot, but the time can be greatly extended under irrigation.

In Australia this is one of the most popular roots grown. Seed can be sown successively from February until September, and it is desirable to mix with the Carrot seed a few seeds of Turnip or Radish, which come quickly and mark the rows. To ensure the retention of moisture the soil must be made firm. Where the land is cold, three weeks elapse before germination.

In South Africa, garden sowings of Carrot seed are made from August until October, and on a large scale from January to March.

For the Argentine Republic, winter and spring are suitable for sowing seed, but there is no difficulty in maintaining a succession by a series of sowings extending through the entire year.

CAULIFLOWER

BRASSICA OLERACEA BOTRYTIS CAULIFLORA

German, Blumenkohl. French, *Chou-fleur*. Dutch, *Bloemkool*.
Spanish, *Coliflor*.

The Cauliflower is less hardy in constitution than the Broccoli, and for this reason the culture is restricted to a shorter period. Cauliflower will not endure more than a few degrees of frost, and a short spell of severe weather brings its season to an end. When grown under natural conditions in the United Kingdom, and in countries having a similar climate, this is essentially a summer vegetable. But it is so greatly esteemed that glass is freely used to advance seedlings in spring for planting out, and again in autumn to bring immature crops to perfection.

Several of the modern introductions are far superior to older varieties in the closeness of the pure white heads, and in delicacy of flavour.

CAULIFLOWER

There are no real difficulties in the culture of Cauliflower. The plant must have a rich soil, sufficient water, and unremitting attention, for which it will not fail to yield an adequate return. Successful results are obtained from a great variety of soils, and especially from deep rich loams. But whatever the staple may be, it must be thoroughly tilled and heavily manured; and manure which is decayed is preferable to fresh stable litter. Experienced horticulturists know that Cauliflower of the most excellent quality can be grown in trenches filled with well-rotted manure alone, and growers do not hesitate to take advantage of the fact when it suits their purpose.

If possible, Cauliflower should follow some crop for which the soil was heavily dressed, such as Celery, Egg Plant, or Tomato. Even then there need be no hesitation in further enriching the land. This may save the necessity of manuring the succeeding crop, but it is important to avoid introducing the spores of slime fungus, which is one of the enemies of the Brassica tribe.

Cauliflower should not be allowed to suffer a check at any stage of its career. On this point the plant will not be trifled with, and nearly all disappointments are traceable to some violation of this primary condition. Whether the check occurs when transplanting, or through neglect in giving water, the result is the same; instead of developing a strong healthy plant, capable of producing a fine head, growth is arrested and a small worthless head is prematurely formed. This process is known as 'buttoning,' and it should not be forgotten that in hot countries more care is necessary to save the plants from this unfortunate ending than in temperate climates.

On land that has not been heavily dressed for the preceding crop, it is requisite to apply stable litter, at the rate of one ton per hundred square yards; or as a substitute half that quantity of well-prepared poudrette ; or 5 cwt. of the crude fish guano which is available in India and some other countries. After the application of one of these manures a green crop should follow. Any of the common crops of the district will answer, but if possible give preference to one of the Pea tribe such as Sunn, or to Crimson Clover. In the absence of these, Niger seed (*Verbesina sativa*), or Jute, may be sown thickly, to be cut and ploughed in while succulent.

Select an open position for the seed-bed, and in its preparation follow the directions given under Cabbage on page 29. With Cauliflower every reasonable precaution must be taken to ensure success. The bed should be easily accessible for hand-weeding, and a width of three feet will therefore be convenient. On the sunny side erect a thin roof of grass or branches, so arranged as to afford shade from noon till evening; this must not interfere with the free circulation of air all round.

The chief enemies of the Cauliflower are Aphis, the grub of the Dung Beetle, Club-root, and a host of Caterpillars, especially Loopers. The kerosene emulsion described on page 20, applied in spray, is destructive to Aphis and the smaller Caterpillars. Fresh dung should not be exposed, or the dung beetle will not fail to lay eggs in it; if the manure is infected, burning is the most certain remedy. Club-root is often the result of defective rotation ; a slight attack may be treated by pinching off the affected roots and dipping them before planting in a solution of Potassium sulphate. The solution is made by adding one ounce of Potassium to two gallons of water. The large Looper Caterpillars must be collected by hand and thrown into a jar of water containing a small quantity of bluestone.

The sowing season for Cauliflower in the southern hemisphere, including Tasmania, New Zealand, and temperate

South America, is August to November. In South Africa, from the middle of November to the middle of February.

For India, Burma, Ceylon, Central Africa, and the West Indies, August and September are the months for sowing in the plains ; and with abundant irrigation, March and May in districts having an altitude of 4,000 feet and upwards. In China, Japan, Egypt, and North Africa, September and October is the most suitable period.

CELERY

APIUM GRAVEOLENS

German, Sellerie. French, *Céleri.* Dutch, *Selderij.* Spanish, *Apio.*

It is fortunate that the culture of this delicious and wholesome esculent has proved to be possible over a large portion of the globe. The principal exception is the sea level of tropical countries during the rainy season. As yet the handsome blanched stems, which are so familiar in Europe, are not everywhere justly valued, and there is no doubt that in some districts there are difficulties in their production, which time and experience may surmount. At present the Turnip-rooted variety is most widely grown, and this for flavouring purposes only. Both as a salad and as a cooked vegetable, blanched Celery, by its inherent merits, must increase in popularity over an extending area.

For the seed-bed, select a rich friable soil which has been dug and exposed to the atmosphere for a few months. Soil taken from an ant-hill is exactly suited for the purpose, and has been found to answer admirably. The insects place every separate atom in position by means of a secretion which enhances the fertilising quality. In width the bed should not exceed three feet, and it may be raised a few inches above the surrounding level. When prepared it must be thoroughly watered and left for twenty-four hours to allow the surface to become dry. Then make transverse furrows, six inches apart, by pressing a straight rod into the soil. Sow seed in the furrows, cover with fine soil, and finish by watering. As the seed is very small it may be evenly mixed with a handful of sand to ensure thin and regular sowing. The bed must be protected from direct sunshine and heavy rain ; the protection to be raised in order that light and air may not be obstructed. Watering daily with a fine spray, until the seedlings are well established, is a necessary part of the routine. Meanwhile, thinning should gradually proceed, leaving the plants about four inches apart. Those taken out can be transferred to another bed, allowing the same distance between them.

COPYRIGHT S. & S.

Before the seedlings are ready for the final beds, trenches must be prepared, and if the soil is not naturally adapted for Celery, something must be done to ensure the most favourable conditions. A plot which has been under Cabbage or Cauliflower is generally suitable. The soil should be rich, friable, and porous, with a subsoil permitting free but not too rapid drainage. A convenient width for the trenches is fifteen or eighteen inches at the bottom, with a depth of ten inches, and four feet from centre to centre. The bottom of the trench to be well broken up and liberally dressed with manure. The soil taken out can be placed on one side; if at a depth of ten inches it is found to be yellow, or blue, or hard, a further depth of ten inches must be removed, and in its place a portion of the top soil, abundantly mixed with manure, can be returned. It is useless to plant Celery on raw land.

When the seedlings are six inches high they will be ready for the trenches. Lift each one separately with a trowel, avoiding needless disturbance of the soil around the roots; but the small side-shoots should be carefully removed. Plant down the centre of the trench at intervals of nine inches; water freely to settle the soil, and repeat irrigation often enough to maintain a moist condition. In hot countries a porous soil will need an inch of water at the bottom of the trench every three days during the growing period. The alternate use of liquid manure with pure water will promote quick development, and Celery is useless as a salad unless rapidly grown.

In the process of transplanting, it is of great importance to avoid giving Celery a check, or the crop will eventually suffer in size or in quality, perhaps in both. Between the time the seedlings are lifted and replanted, the interval should be extremely brief. Deal with a very few at a time, removing each one with roots entire, and keeping them moist until they are again in the soil.

When the stems attain a height of eighteen inches they are ready for blanching. In temperate climates this is accomplished by gathering the stems together to prevent the soil from getting between, and drawing the soil around each plant. The task is completed in three or four operations, at short intervals, until only the top leaves are visible.

In hot climates this method does not answer. While blanching is in progress, contact between the soil and the plant is injurious. But the object can be attained by using drain pipes, semicircular tiles, or any other means of excluding light. The stems of each plant are gathered together, loosely tied, surrounded with tiles, the tops of which are closed, and the trench filled in.

The season for sowing Celery in India, Burma, Central Africa, the West Indies, and tropical South America, is August, September, and October; March and April for the Himalayas; July and August on the Nilgiri Hills. In South Australia, main crops are sown in November and December; succession crops in February and March. For New Zealand, South Africa, St. Helena, Egypt, and the temperate climates of South America, October and November are the proper months; March and April for China and Japan.

When Celery is out of season, and in districts where the plant cannot be grown with success, the seed is useful for flavouring soups and sauces. For this purpose seed of common sorts answers as well as that which is saved from highly cultivated pedigree stocks.

Celeriac is used for flavouring purposes, and it is also cooked as a vegetable. The edible portion is a large bulbous growth at the base of the leaves. Ordinary Celery sometimes shows a tendency to assume this form when grown on poor land.

CHICORY

CICHORIUM INTYBUS

German, Cichorie. French, *Chicorée.* Dutch, *Chicorei.*
Spanish, *Achicoria.*

THIS plant is grown with success in all countries having a warm summer and a distinctly cold winter. It may be cultivated in tropical countries at an altitude of 2,000 feet by sowing seed at the end of June, and at the sea level by sowing in November. Should the water supply be arrested, the plants run to flower and become worthless. In sub-tropical countries it is not advisable to sow until the middle of the season, and in temperate climates, such as that of Great Britain, June has proved to be the most favourable month. The culture which is successful with Carrots answers for this plant.

COPYRIGHT S. & S.

The roots are lifted in autumn and stored. Subsequently they are packed in boxes and placed in a warm and perfectly dark cellar, when leaf-growth commences. These blanched leaves, or stems, form an excellent component of winter salads, and are frequently eaten alone in the same manner as

Celery. They also make an excellent dish when cooked and served in the same manner as Sea Kale.

Roots of Chicory specially grown for the purpose are dried and ground for admixture with Coffee.

CORN SALAD, or LAMB'S LETTUCE

VALERIANELLA OLITORIA

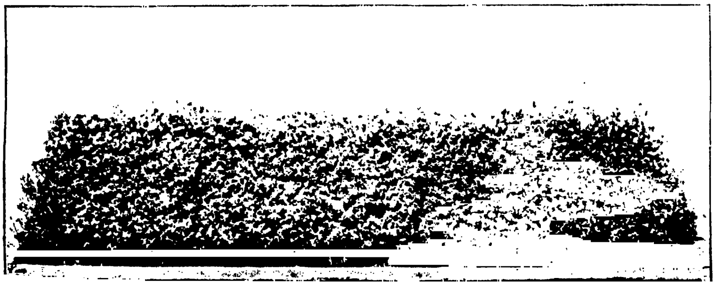
German, Lämmerſalat. French, *Mâche*. Dutch, *Veldsalade*.
Spanish, *Canónigos*.

CORN SALAD grows naturally in Europe, North Africa, and Western Asia, and it has been introduced into America. The culture is therefore possible over a wide area, under the same conditions as Lettuce or New Zealand Spinach. The leaves are used in salads and are very much appreciated on the Continent of Europe.

CRESS

LEPIDIUM SATIVUM

German, Kreſſe. French, *Cresson*. Dutch, *Kers*. Spanish, *Mastuerzo*.



COPYRIGHT S. & B.

THE constant demand for this salad in Eastern as well as in Western markets is a sufficient proof that it meets one of the most wholesome cravings of humanity. Fortunately the cultivation is simplicity itself, and the crop comes so quickly that a gold prospector, changing camp once a week, may enjoy Cress as a luxury.

Any fine soil, even pure sand, will produce a crop. Although seed is generally sown and lightly covered with soil, there is really no need to cover the seed. If sown on a smooth surface which is kept moist, the crop will rise clean and almost fit for table, with scarcely an atom of grit in it. Flower pots are often used to grow Cress by covering them with woven fabric and turning them upside down, allowing the rim to rest in deep saucers of water. The surface is thickly sown with seed, and the fresh green growth is an ornament to the table, where it can be cut as wanted. The porous jars of the East are utilised for the same purpose by binding around them loose string which is covered with fine wet soil. Seed is sown all over the outsides, and the interior is filled with water. In a subdued light the crop becomes an elegant ornament in the course of a few days.

Where Cress is continually in demand the usual practice is to sow a succession of boxes. In very hot or wet weather these can be placed on a verandah.

Water Cress (*Nasturtium officinale*).—This plant is indigenous on the Himalaya Mountains; and at an altitude of 2,000 feet and upwards, it is found throughout India in streams which have a constant volume, such as those which feed irrigation canals. Water Cress of the finest quality is produced in flowing streams, and it is easy to arrange for a supply by causing the water, drawn from wells for irrigation, to pass through a shallow tank in which Water Cress readily takes root.

It is said that in London alone the sum of £300,000 is expended every year on this appetising and refreshing salad. The plant no doubt meets one of the needs of the race in a palatable form. The statement of a French chemist that Water Cress contains, in comparatively large proportion, an assimilable salt of iron, is probably the scientific explanation of the fact.

CUCUMBER

CUCUMIS SATIVUS

German, Treibgurke; Gurke. French, *Concombre à forcer.* Dutch, *Komkommer*
Spanish, *Pepino.*

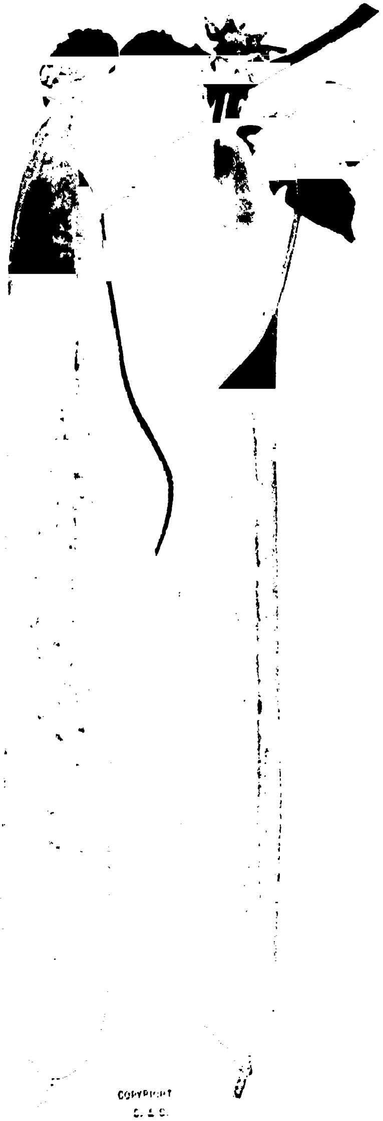
Frame Cucumber.—The artificial heat which is necessary for the successful culture of Cucumbers in temperate climates may lead to the erroneous conclusion that in tropical countries the plant can be grown without the least difficulty. Unfortunately this is not the case. In countries subject to alternating trade winds, which cause a rainy season from June to September, and drought for the remainder of the year, very considerable skill is needed to produce handsome fruits of delicious British Frame Cucumbers. But the interest created by the effort has cheered the lives of many men whose duty detains them 'on guard' at numerous dull civil or military outposts in India, Burma, Central Africa, the West Indies, and Brazil.

Although Frame Cucumbers need a high temperature, they do not thrive under the fierce glare of an unclouded tropical sun.

The selection can be made from quite a long list of superb modern varieties, which differ in form, size, and general appearance, and some are more prolific than others. But all are subject to the attacks of a host of insect foes, which need incessant vigilance if healthy growth is to be maintained.

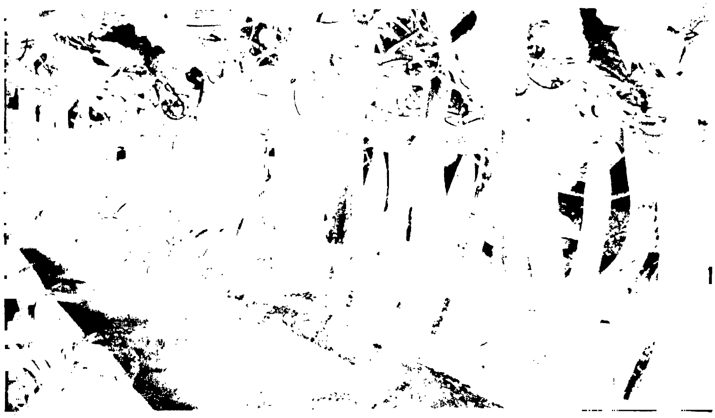
The attempt to grow Cucumbers on retentive land is mere waste of seed and labour. The soil must be somewhat sandy, very friable, in a high state of cultivation, and an arrangement for irrigation is imperative. The digging must be thoroughly well done, and while it is proceeding, poudrette, at the rate of ten cwt. to every hundred square yards, should be worked in. Other manures can, of course, be used, but it is important that they should be in a finely divided state.

Shade will be necessary, and the native system of Guzerat is entirely suitable. Posts eight feet long are driven eighteen inches into the ground, ten feet apart, every four posts forming a square. The tops are connected with bamboos, to which lighter bamboos are attached about 2½ feet apart, and the addition of leafy branches affords a checkered shade. Seeds of the Lima Bean or Luffa are put in near the posts, and the plants rapidly run up and form a screen. If left alone the shade would soon be too dense, and it requires unceasing watchfulness to maintain the degree of light which is most favourable for the Cucumbers.



Should posts be scarce and time permit, put in a few seeds of *Sesbania ægyptiaca* in June, where the poles should stand. Only one plant must be allowed to grow at each station. In four months there will be a number of trees ten feet high, equally spaced, and these must be reduced to living poles by rough pruning.

Frame Cucumber seeds may be sown monthly from November till July. Kerosene emulsion, as described on page 20, added to one hundred times the quantity of water, must be sprayed over the plants to save them from insect enemies. The little red beetles, known as ladybirds, are generally abundant on Cucumber plants and are worth protecting. They live on aphis and other small insects.



COPYRIGHT S. & S.

In certain districts, at seasons when the flowers are not fertilised naturally or by insect agency, it must be done by hand. The task is very simple. With a camel's-hair pencil take pollen from the anthers and lightly dust on the stigma, when the fruits will set and develop.

Liquid manure should be freely used while the plants are growing, and so long as they continue to produce fruit.

Ridge Cucumber.—The small Cucumbers which in the United Kingdom are known as Gherkin, or Ridge Cucumber, are in Eastern countries probably consumed more freely than any other vegetable. Several varieties, suited for particular seasons, are cultivated. The most important period of sowing is from September to January. A little management will secure a succession of productive plants during the hot season of the year.

A warm climate suits Ridge Cucumbers, and a high temperature will do no harm, assuming that water is used copiously. Any fairly good garden soil will grow the crop, but to ensure an abundant return the land must be enriched with some kind of manure that can be minutely incorporated when preparing the land. Poudrette and fish guano are both suitable, and should be freely used.

The ground may be either dug or ploughed. Before commencing, some arrangement for irrigation should be considered. A few seeds are sown in groups, at intervals of about three feet, allowing a space of five feet between the lines. The plants are permitted to run over the ground, and the ends of the shoots are pinched out to promote branching. In cool climates, ridges may be raised and seed sown on the sunny side.

When the plants are growing freely, manure water can be used with good effect.

In Australia, the early crop is raised by sowing on a hot-bed in June and July. The plants are transferred to pots in September, and when a few rough leaves have developed they are transferred to the open under the protection of a hand-glass until the danger of frost is over. Another practice is to dig a pit, almost filling it with hot manure, on which a mound of rich friable soil is raised : the seed is sown and for a time covered with a hand-glass. Later crops are obtained by sowing in the open ground in September and

October; the plants are mulched with rich manure and kept going by frequent waterings.

For South Africa and the temperate countries of South America, the seasons and treatment are the same as for Australia.

In Egypt and other countries bordering the Mediterranean, sowings should be made fortnightly from January to May inclusive.

DANDELION

TARAXACUM OFFICINALE

German, Löwenzahn. French, *Pissenlit.* Dutch, *Leeuwentand of Paardebloem.* Spanish, *Armagon.*

THE Dandelion may be cultivated in almost every habitable country of the world. For many years it has been grown in the Deccan and the North-west Provinces of India as a remedy for liver troubles. When the leaves are properly blanched, they form an acceptable component of salads, and are also largely used alone.

The roots are dried, ground, and mixed with an equal quantity of pure coffee, for making an agreeable beverage which is believed to have a medicinal value.

At an altitude of 2,000 feet the plant thrives in tropical regions. As distance from the equator increases, it can be successfully grown nearer the sea level.

Dandelion is not particular as to soil. Sow seed in lines fifteen inches asunder where the plants are to stand, thin to a foot apart in the rows, keep the crop clean, and give sufficient water to maintain growth.

From seed sown in August and September, plants should be ready for blanching from December to February. A flower pot inverted over each plant, having the hole stopped with clay and a covering of straw, makes an efficient blanching arrangement. But unless light is totally excluded for a sufficient time the flavour is bitter. During this stage there must be no excess of water, or the plants will rot.

Roots for coffee may be dug in January and February, when they can be carefully washed and dried in the shade under a strong breeze.

In South Africa and South Australia, seed is sown in August and September for use in December, January, and February. For China, Japan, and New Zealand, the sowing season is the same, but the plants stand the winter and are used in the following year. Early summer sowing is recommended for the Argentine Republic.

EGG PLANT

SOLANUM ESCULENTUM

German, Eierfrucht. French, *Aubergine.* Dutch, *Zoete aardappel.*
Spanish, *Berengena.*

As a vegetable the Egg Plant possesses qualities which are highly esteemed in Southern Europe and by Eastern people. Those who visit India are not usually enamoured with the peculiar flavour of this fruit on first acquaintance. As a rule, the taste has to be acquired. A little experience generally results in a change of opinion, and not infrequently the fondness for it becomes very pronounced. The degree of flavour is in inverse proportion to the size of the fruit. The large mild specimens are first appreciated by strangers. Those which are small and full-flavoured come to be preferred later on, and the latter are always chosen by the natives. As to the wholesome qualities of this fruit there is not the least room for doubt. Fortunately the supply is reliable in good condition for a large portion of the year.

The crop succeeds on any deep, well-tilled garden soil.

Seed is sown in lines six inches apart on a bed of friable loam. When the seedlings are six inches high they are transferred to fruiting quarters, in rows two feet asunder, with intervals of eighteen inches in the rows. One inch of water per week, from either rain or irrigation, is a fair allowance for ordinary soil, but more will be necessary for sandy land under strong sunshine and a dry atmosphere. After the fruit is set and has begun to grow, liquid manure at short intervals will have a beneficial influence on the crop.

The chief enemy of the Egg Plant is a root-parasite of the Broomrape family, which attaches itself to the roots, and produces a thick white stem bearing numerous flowers and a large quantity of seed, entirely at the expense of the host. The Egg Plants attacked are rendered entirely unproductive, and there is no remedy. The affected plants should be pulled up and burned. As the parasite is used as food for buffaloes, the dung should also be sterilised by burning. Prevention is possible by a carefully ordered rotation of crops. The parasite will attack and thrive on any species of Solanum. Therefore neither Egg Plant, Tomato, nor Potato should be grown on the same land at a shorter interval than three years.

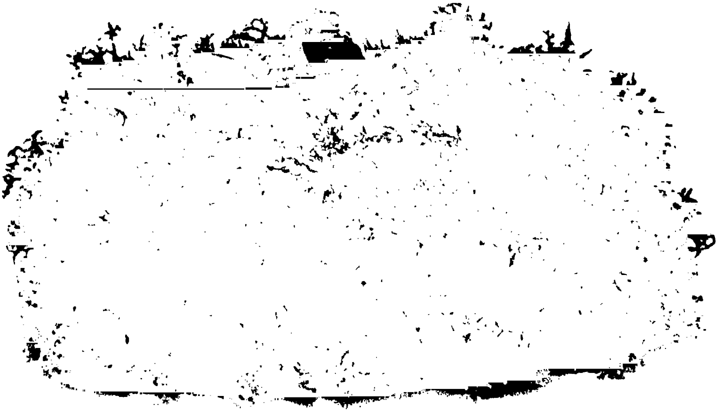
Egg Plant can be successfully grown in all countries having a decidedly warm season, whether the cold season be moderate or severe. In Canada, Russia, and countries where a similar climate prevails, seed is sown in March on hot-beds which are matted at night until frost disappears. The plants are gradually hardened and set out in April or May.

In temperate South America, South Africa, and New Zealand, the months for sowing are September, October, and November; March and April for China, Japan, the Himalayas, and Kashmir; April, August, and December for Egypt, Central and Southern India, Burma, Central Africa, the West Indies and Abyssinia.

ENDIVE

CICHORIUM ENDIVIA

German, Endivie. French, *Chicorée*. Dutch, *Andijvie*. Spanish, *Escarola*.



COPYRIGHT S. & S.

THIS is the principal European winter salad, distinguished by its peculiar nutty flavour from all other components of the salad bowl. When nicely blanched the curled varieties form an attractive table ornament.

In tropical countries, seed should be sown from the end of August until the end of November; the earlier date for districts at an altitude of 2,000 to 4,000 feet. Above this height the rainfall becomes an important factor, because Endive will not endure more than two inches of water weekly. The bed must in all cases be shielded from direct sunshine by a matted shading arranged to admit ample light and a free circulation of air.

Seed is sown on a bed of rich friable soil, and when the plants are two inches high they are set out at regular intervals of twelve inches. Sufficient water must be supplied until full development. The leaves are then gathered together, tied at the top, and covered with an inverted flower pot having the hole stopped. The pot must be shaded from the sun, or the plants will be cooked. In perfect darkness blanching will be finished in a week. Only sufficient heads should be blanched at a time to meet requirements, and during the process snails must not be allowed to do mischief. These ground vermin are very troublesome among blanching Endives.

In Egypt seed is sown from September to March, and by attention to shading and watering it is easy to secure a prolonged supply. The sowing season for Malta, Cyprus, and Madeira is September; a little earlier for Canada and the northern United States; November and December for New Zealand; January, February, and March for Australia and South Africa. December and January are the most suitable months for the temperate countries of South America.

HERBS

A KITCHEN GARDEN which is unable to meet an ordinary demand for a variety of Herbs fails in one of its most important functions. In addition to the daily supply of vegetables throughout the year, a considerable number of plants are needed to ensure diversity in the flavouring of various dishes. Without these the routine of the kitchen must of necessity become monotonous. Apart, therefore, from the crops which occupy the main area of a kitchen garden, a small but important section must be devoted to Herbs, and fortunately this department can be managed in hot climates without much difficulty.

A few general observations on the seasoning, flavouring, and medicinal Herbs which can be grown from seeds, will save much repetition. The following list includes those which are of chief value in the United Kingdom. Where necessary, brief remarks are added concerning the purposes they serve, or on the method of culture.

None of the hardy plants of Europe can be relied on to endure the rainy season of tropical countries at sea level, if the rainfall exceeds fifty inches during the four months from June to the end of September. In the tropical districts of the northern hemisphere generally, October is hot, steamy, and unfit for sowing seeds of plants which are indigenous in temperate climates. November is the earliest safe month for the work. At an altitude of 2,000 feet, with rainfall below fifty inches, August is the most reliable month for sowing, but in some instances the sowing may be in June, immediately after rains have cooled the soil. By protecting the seed-bed with a strip of cocoa-nut-fibre matting, raised two or three feet above the ground, tightly stretched and inclined at an angle of 45 degrees on the sunny side, the probability of success will be increased.

Angelica (*A. Archangelica*) is sometimes grown for preparation as a confection.

Balm (*Melissa officinalis*).—The dried leaves make a pleasant infusion which is used in fevers. This herb is easily raised by sowing in August for tropical countries, and at the beginning of the growing season where a lower temperature prevails.

Basil, Bush (*Ocymum minimum*).—A tropical plant, widely cultivated in the East. Seed may be sown at any time during spring or summer.

Basil, Sweet (*Ocymum Basilicum*).—Plants may be secured from seed sown at the beginning of the growing season. In temperate climates, the assistance of a gentle hot-bed is necessary.

Borage (*Borago officinalis*).—Used for flavouring claret-cup, and much grown by bee-masters. Sow seed on an open border.

Chervil, Curled (*Anthriscus Cerefolium*).—Commonly grown for salads and garnishing. Any ordinary garden soil suits the plant, and the supply is maintained by frequent sowings.

Chives (*Allium Schœnoprasum*).—This small herb is nearly related to the Onion. It grows sparsely in rocky pastures of the North of England, and is also found through Europe and Northern Asia down to the Himalayas. The plant has long been cultivated for flavouring soups and other dishes. In temperate climates it needs no special care, and is frequently grown from seed in ordinary garden soil. It is also propagated by separating and planting the bulblets.

Fennel (*Fœniculum vulgare*).—The graceful foliage of this herb is used for garnishing fish at table. The tender stalks are also mixed with salads and as a component of several fish sauces. In the cool season the plant is grown throughout tropical countries without difficulty.

Horehound (*Marrubium vulgare*).—Widely known in the East by its Persian name Farasayun. It is a common plant in Persia and valued as a stimulant in chronic bronchitis. May be easily cultivated in tropical countries by sowing seed at the beginning of the cool season.

Hyssop (*Hyssopus officinalis*).—The Badranjboya of the Arabs. It is widely cultivated in dry Eastern countries, and the fresh leaves are used for flavouring. In the cool season of hot climates, the plant thrives in an ordinary border.

Lavender (*Lavandula vera*).—Universally valued for its perfume. It can be grown from seed during the cool season in the tropics, and throughout the ordinary growing season in sub-tropical countries.

Marjoram, Pot (*Origanum Onites*).

Marjoram, Sweet Knotted (*Origanum Marjorana*).—This valuable herb is used both green and in the dried state.

need ordinary kitchen garden treatment.

Parsley (*Carum Petroselinum*).—So essential is Parsley in the cookery of Europeans that wherever they have settled in tropical regions this herb is almost certainly to be found. Happily, it is very accommodating and can be grown in fine condition during a considerable part of the year, unless destroyed by continuous rain.

COPYRIGHT S. & S.

The sowing season for tropical countries in the northern hemisphere extends from August to November; the first month for districts with a less annual rainfall than 50 inches, the last month for climates which are still more moist. In the River Plate district of South America, as well as in South Africa and the Australian colonies, sowings may be made both in spring and autumn. Ordinary friable loam, which has been well manured for previous crops and pulverised to a considerable depth, is most suitable for Parsley. The seed should be sown where the plant is to develop, because the tap-root at once goes down in search of moisture. Lines eighteen inches apart and plants at intervals of one foot in the rows, afford the requisite space for growing a good crop.

Rosemary (*Rosmarinus officinalis*).

Rue (*Ruta graveolens*).

Sage (*Salvia officinalis*).—One of the herbs which is used both green and when dried.

Favourite border plants in all warm, dry climates.

Savory, Summer (*Satureia hortensis*).—An aromatic herb grown in tropical countries from seed sown in August. It is rarely kept through hot, dry weather, and is certain to die off with the opening monsoon.

Sorrel (*Rumex scutatus*).—French Sorrel is used as an ingredient in soups, sauces, and salads. It may be successfully grown in tropical countries, at an altitude exceeding 5,000 feet, by sowing in spring on the shady side of a hill; and in milder climates with ordinary kitchen garden treatment.

Thyme (*Thymus vulgaris*).—A favourite aromatic herb used in flavouring. This plant can be raised without trouble in dry climates of the tropics by sowing seed after the rainy season has passed, on a bed of well-tilled soil, where the plant is to stand. In semi-tropical and temperate countries, ordinary border treatment is suitable.

KOHL RABI, or KNOL KOHL

BRASSICA OLERACEA CAULO-RAPA

German, Kohlrabi. French, *Chou-rave*. Dutch, *Knol-rabi*.
Spanish, *Kohl Rabi; Nabicól.*

KOHL RABI is commonly known as the Turnip-rooted Cabbage. It is deservedly popular in tropical countries, and on the Continent of Europe where the summers are too hot to permit the Turnip to be grown with success. In many districts it may be possible to grow both plants satisfactorily; the Turnip in spring or autumn, and Kohl Rabi when the heat of summer is too great for the former. This arrangement prolongs the season, and there is also the advantage of a change of flavour.

An important point in the culture of Kohl Rabi is to grow the crop quickly; it is then delicate in quality and free from fibres. When produced slowly the swollen stem becomes woody in texture, and it is spoiled as an esculent.

COPYRIGHT S. & S.

Spring sowings, if irrigated freely, will grow vigorously in heat that arrests the growth of Turnips. The preparation of the ground is the same for both.

For main crops of Kohl Rabi, where the climate is favourable, the transplanting system is usually adopted. Plants are raised on a seed-bed in the same manner as Cabbage, and while quite small are put out in lines two feet apart, allowing intervals of ten inches or a foot between plants in the rows. But for early crops in tropical countries it is advisable to sow seeds where the plants are to finish growth, and to thin them to the proper distances. This method is generally reliable, and time is saved because the plants suffer no check. The thinnings may be transplanted if wanted.

The sowing season for Kohl Rabi in India, Ceylon, Central Africa, and the West Indies begins in August; but for districts having an altitude of over 2,000 feet the first sowings may be in April, provided labour for irrigation and material as shelter from hot winds are at command.

January to March is the sowing period for South Australia; December to March for New South Wales; the beginning of September, for transplanting in November, in New Zealand; and two seasons are available in South Africa—September and October, and again in February and March.

In Egypt main crops are sown from November to February; but except in the middle of summer, Kohl Rabi seed may be sown during the remaining months of the year.

March and April suit China and Japan; September and October the temperate countries of South America.

LEEK

ALLIUM PORRUM

German, Lauch. French, *Poireau*. Dutch, *Look*. Spanish, *Puerro*.

ANCIENT records indicate that the Leek was cultivated in Egypt under the dominion of the Pharaohs, and to some extent it has been grown in that country in modern times.

In tropical climates generally the plant is not widely known, although it can be produced of fair quality in almost every country which is subject to a high temperature.

Seed should be thinly sown on a bed of rich friable soil, from which the plants must be transferred when about eight inches high; the stronger to be set six inches apart in prepared trenches, and the smaller in a separate bed at intervals of four inches. The trenches must be deeply dug and well manured in readiness for the crop. After transplanting, the trenches should have an inch of water, followed by a daily sprinkling for a week. Subsequently, half an inch of water twice a week will be necessary, and at short intervals liquid manure, in addition to the irrigation, will stimulate growth.

COPYRIGHT S. & S.

The method of transplanting Leeks, which is followed with marked success in Scotland and by market gardeners in England, is to drive the dibber down six or eight inches deep, insert the plant, allowing it to rest at the bottom of the hole, and either fill in with fine rich soil which is watered at once, or trust to the watering alone to carry down sufficient soil to firm the plant in. Shading the bed until the young Leeks take hold is necessary.

As the plants develop, the soil taken out of the trenches must be gradually restored in order to blanch the stems to silvery whiteness. Slightly nipping off the tops of the leaves does not appear to arrest growth, and it reduces the evaporating surface.

In the Himalayas, Kashmir, China, Japan, and Canada seed should be sown immediately frost has gone, or perhaps a little earlier, on a hot-bed, under protection at night. May, June, and July are the months for South Australia. In South Africa, temperate South America, India, Burma, and Ceylon sowings may be made at an altitude of 2,000 feet in August, and at the sea level in November. During October, the interval of calm between the south-west monsoon and the north-east current is the trying period for young plants of all kinds.

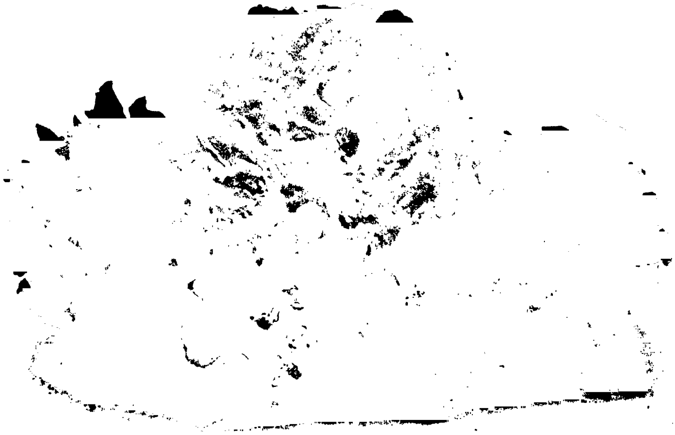
LETTUCE

LACTUCA SATIVA

German, Bindſalat; Kopfſalat. French, *Laitue romaine; Laitue pommée.*
Dutch, *Latuw.* Spanish, *Lechuga.*

HERODOTUS records that Lettuce was served at the tables of Persian monarchs 400 years before the Christian era. The cool and refreshing properties of the king of salads are therefore not a modern discovery, nor is the use of it limited to Europeans. All white residents in tropical climes regard Lettuce as simply priceless.

There are two distinct types, and it is impossible to say which is more highly esteemed, or is of greater service. Cos Lettuce, the *Laitue romaine* of the French, is limited to summer use, and is frequently enjoyed alone, without flavouring of any kind. The growth is upright, and the blanched hearts



COPYRIGHT S. & S.

CABBAGE LETTUCE

COPYRIGHT S. & S.

COS LETTUCE

are extremely crisp and appetising. Cabbage Lettuce, the *Laitue pommée* of the French, grows close heads with overlapping leaves, and is specially adapted for winter and spring use. The latter is more frequently employed as the chief constituent of dressed salads than the former. Each class numbers a considerable list of excellent varieties, differing in size, form, colour, and suitability for temperate and warm climates. In the East there can be no doubt that for its crispness the Cos section is in greater favour. Another reason for this preference is that immediately the Cos varieties pass their prime the uprising seed-stems notify the fact, whereas the Cabbage varieties give no such timely intimation. This long-standing habit is a great merit in temperate climates, but in hot countries it is often misleading.

In a moderate temperature Lettuce will flourish in any rich garden soil, if kept moist and protected from very heavy or long-continued rain. A plot should be chosen for this crop which was generously dressed in the preceding year, and does not need fresh manure.

Seed may be sown on an ordinary bed, unless heavy rain is anticipated. In such cases the sowing should be in boxes, under shelter of a roof, and where light has free access. The seedlings must not be crowded; when two inches high they can be planted out nine inches apart, and should be watered daily in dry weather to ensure rapid growth. Immediately the plants mature they must be drawn for use, or be destroyed. Those which show signs of flowering, or which have stood long enough to become tough and bitter, are very disappointing. A continuous supply of tender, delicately flavoured Lettuces can only be maintained from regular weekly sowings.

Early produce is secured in cold climates under protection, and in hot countries by shading with mats which break heavy rain into fine mist and partially arrest the sun's rays while admitting sufficient light to keep the plants robust. There is no better material for shading than the cheap cocoa-nut-fibre matting which is abundant in Eastern bazaars, and it is most efficient when tightly stretched. Months need not be named for sowing Lettuce seed. In all countries it will be safe to sow small quantities throughout the growing season.

MAIZE, or INDIAN CORN

ZEA MAYS

German, Maïs. French, *Maïs.* Dutch, *Maïs.*
Spanish, *Maiz ; Maiz dulce.*

IN the form of Green Corn, Maize furnishes a delicious and wholesome vegetable. The crop grows luxuriantly in the hottest climate if regularly irrigated. Long-continued heavy rain is alone prejudicial, because it washes away the pollen and prevents the development of seed.

The soil which especially favours the crop is a stiff loam, well tilled, and freely manured with town sweepings, assisted by the addition of 10 lbs. of superphosphate of lime for every 100 square yards of land. Irrigation equal to one inch of water over the surface every five days will be necessary during the hottest and driest period of the year ; a smaller quantity will suffice at other seasons.

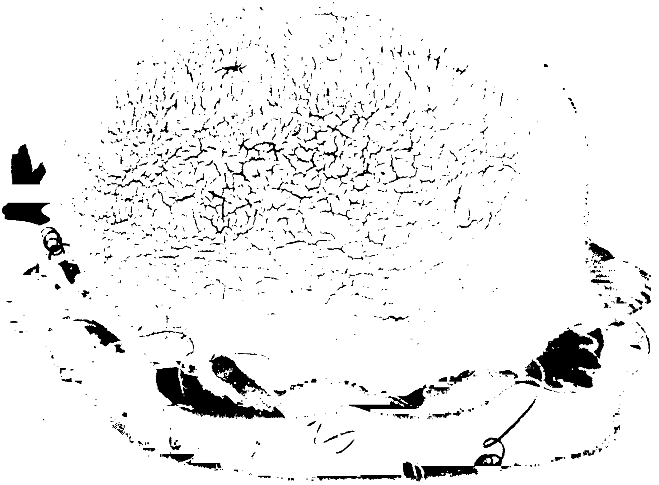
Seed may be sown weekly, in lines two feet apart, with twelve-inch intervals in the rows. March, April, and May are the sowing months for Green Corn, and August and September for grain crops. These periods are suitable for India, Burma, Central Africa, Abyssinia, and the West Indies.

March, April, and May is the favourable season for Egypt, Canada, China, and Japan ; September and October for South Africa, Australia, and South America, both in the torrid and temperate regions.

MELON

CUCUMIS MELO

German, Melone. French, *Melon*. Dutch, *Meloen*. Spanish *Melón*.

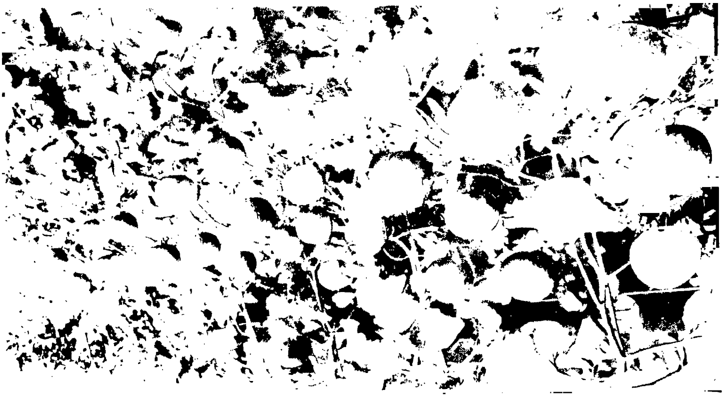


ALTHOUGH the Melon is a tropical plant, the indigenous varieties of India and other hot countries are not to be compared with the splendid fruits produced under artificial culture in the United Kingdom. From the loose system which prevails in the Deccan and elsewhere, it is extremely uncertain whether any native seed that may be sown will produce Melons resembling the fruit from which the seed was taken. In England, on the contrary, some of the ablest hybridists have devoted years of earnest labour to the improvement of this cool and delicious luxury, and their efforts have been crowned with conspicuous success. The Melons raised within the past decade, by skilful crossing of the finest varieties, are not only elegant in form and deep in flesh, but they possess a flavour which is unrivalled by the best productions of the East.

Two conditions are essential to ensure handsome fruits of the highest quality. The plant needs a high temperature, between 70° and 80° F. (21° to 27° C.) by night, and it may go higher by day without injury, provided the roots are not allowed to suffer for want of water. Unless the proper degree of heat is natural to the district, or can be maintained artificially, there is always more or less risk in growing Melons. The second point concerns the atmosphere. Up to a certain stage it is easy to grow Cucumbers and Melons under one roof, but the time comes when the same atmosphere does not suit both plants. Cucumbers flourish in warmth and moisture, and the fruits are cut while quite young. Melons have to be ripened, and to finish them a warm, dry atmosphere is imperative. These two conditions furnish the key to successful culture in any country of the world. In cool climates the aid of glass is indispensable, together with means, however primitive, of preventing an approach towards the freezing point during cold nights. In England splendid specimens are grown in numberless gardens on hot-beds of fermenting manure, covered with frames and protected with mats when necessary. Span-roof glass houses, equipped with a furnace for maintaining the requisite temperature, are also in common use, and this is the most reliable method. But in every case the Melon must be regarded as a summer fruit, and those who have to fight an unfavourable temperature should master the requisite details and be prepared with the necessary materials.

In countries where Melons are grown in the garden, trenches are made one foot deep and six feet apart. These trenches are partially filled with the richest compost available, and they ought to be prepared at least six months in advance of the sowing season. A few seeds are planted in groups four feet apart, and water is given daily until the vines begin to run. Only the two finest plants of each patch are allowed to stand. After a brief interval the leading shoot of every plant is nipped out to encourage lateral branching. Water may then be increased in quantity, until in tropical countries one inch over the entire surface of the trench is given every two or three days.

The pollen from flowers of inferior Melons may be wafted over choice plants at a critical moment and impregnate the flowers of a high-class strain. This will not materially affect the flavour of the fruit, but the cross will render the seed worthless, and if sown there will probably be keen disappointment in the following season. The only satisfactory course is to obtain reliable seed of a good variety every year.



COPYRIGHT S. & S.

Where insects fail to impregnate the flowers, it can easily be done by gathering pollen with a camel's-hair pencil and lightly dusting it on to the stigma.

The sowing season is January and February for India, Burma, Ceylon, Central Africa, and the West Indies; February and March for Syria, Egypt, Beluchistan, Canada, Kashmir, China, and Japan, but in these countries fermenting material and garden frames will be necessary during frosts. In New South Wales and Victoria, September and October are suitable; and in New Zealand and temperate South America, August and September are the proper months.

The fruits should be carefully watched as the ripening period approaches. Those who are accustomed to grow Melons can judge of fitness by slight pressure near the stem; others find in the aroma a sufficient guide to the date for cutting. Near the finishing time it is important not to allow the fruits to get wet, and they ought not to rest on the bare soil. A dry tile or part of a flower pot will save them from injury.

MUSHROOM

AGARICUS CAMPESTRIS

German, Champignon. French, *Champignon.* Dutch, *Paddestoel.*
Spanish, *Seta; Seta de cardo.*

It is needless to dwell on the merits of an esculent which is highly esteemed in the cookery of all European nations, especially as the Mushroom deserves to be prized quite as much for its nutritious qualities as for its delicious flavour.

The principles of successful culture may be gleaned from a moment's consideration of the conditions which favour the natural growth of this fungus in the pastures of the United Kingdom and other countries. Mushrooms are never found in open fields during winter or spring, and seldom in the early part of the summer. But as autumn approaches, and the nights remain still and warm, with the soil moist and warm also, this delicacy is freely produced. The night temperature which is most favourable to the Mushroom is about 60° F. (15° C.). Much above this register tends to make the buttons come small, and below 55° F. (13° C.) soon brings production to an end. Where a steady temperature of 60° F., combined winter. This hint may be of some value in localities where unused buildings can be turned to useful account.

The proper degree of moisture in a Mushroom bed is all-important. The manure should always be sufficiently damp to hold together, but it should not part with any of its water under pressure. A bed that is allowed to become dry will soon cease to be fruitful. Water when administered should be of the same temperature as the bed.

In Northern India, the winter months, from September until March, are the most suitable for growing Mushrooms. As the fermenting material will raise the temperature inside a building, a considerable altitude is necessary to get a sufficiently low initial temperature. In cooler countries this difficulty is not experienced. But the principles explained will in any case render it easy to form a judgment as to whether Mushrooms are possible of attainment.

MUSTARD

SINAPIS ALBA and S. NIGRA

German, Senf. French, *Moutarde*. Dutch, *Mostaard*. Spanish, *Mostaza*.

COPYRIGHT S. & S.

THIS salad is grown in the same manner as Cress. It is in constant use alone, and also in combination with Cress, Lettuce, Beet, and other constituents of dressed salads. The seed should always be sown alone, and with a little management a continuous supply may be ensured in any climate during every week of the year. Shade will be necessary where great heat prevails, and protection from cold in other cases. The important point is to sow small quantities at brief but regular intervals. If intended to be used with Cress, the latter must be sown three days in advance of the Mustard. The plant should be cut before the second pair of leaves begins to show.

There are two varieties, the White and the Brown. The former is in general favour ; the latter remains rather longer in fit condition for consumption.

ONION

ALLIUM CEPA

German, Zwiebel. French, *Ognon*. Dutch, *Uien*. Spanish, *Cebolla*.

SINCE the dawn of history the Onion has been an important article of human food, and it appears to have been highly esteemed among the nations of the East. In various forms it has been, and still is, employed in the cookery of European countries all the year through. Even those who would disdain to eat an Onion alone are more indebted than they suspect to its presence for the flavouring of dishes that are regarded as delicacies on the tables of epicures.

During the growing period, the thinnings are sent to the kitchen for use in salads. After the crop has been lifted and stored, the best varieties remain sound and improve in flavour until the new crop is ready. Those who like to have a succession of young green crops take care to make frequent sowings expressly for this purpose.

Any fairly good garden soil which has been generously treated will grow a satisfactory crop of Onions. The bed must be finely broken up and trodden firm before sowing. In tropical countries seed of the previous year's harvest is essential to success. It must also be thoroughly ripened and stored in a dry spot until wanted.

COPYRIGHT S. & S.

Where a selection is possible, Onions should be grown on land that was heavily dressed for a preceding crop, such as Cauliflower or Celery. Should manure be necessary it must be in a finely divided state. Poudrette, fish guano, and any artificial which is rich in potash answers well. When the bed is sown, and has received the finishing touch, a light top dressing of wood ashes and soot, scattered over the surface, not only assists the crop but has the further advantage of being disliked by insect pests, especially by the Onion fly.

There are two distinct methods of cultivation. One is by sowing seed where the bulbs are to mature; the other by sowing on seed-beds or in boxes for transplanting. The former may be less troublesome, but the latter yields a more regular plant and a heavier crop. Those who are accustomed to compete at horticultural shows invariably transplant. The magnificent specimens they exhibit are a sufficient proof that the very finest Onions are produced by this system, and the crop is spared the depredations of the Onion maggot. Transplanting also affords the opportunity of selecting the strongest seedlings. By putting these at exact intervals, much is done to ensure uniformity in the size of the bulbs. One word of caution is, however, of importance. Care must be taken to insert only the fibrous roots in the soil. To bury any portion of the stem results in thickening the necks, and this delays ripening. The bulbs should be allowed to sit on the soil, so that they may be fully exposed to light and air. This has a material effect on the length of time the crop can be stored.

In favour of transplanting it is sometimes urged that seedlings of the true colour can then be chosen. This argument simply proves that mixed seeds are only too common both in India and the Colonies. Crops from true stocks of seed need no such selection either in the seed-bed or when transplanted. A large breadth of any high-class variety of Onion will present no deviation whatever from the true type.

The beds for Onions need much attention in hand weeding and thinning, and therefore a width not exceeding four feet is advisable. There should be narrow alleys between, which save the necessity of trampling among the plants.

The drills for seed are most convenient when drawn across the beds at right angles to the alleys. Between the lines the space may vary from six to twelve inches, according to the varieties sown and the size of the bulbs required. The drills must be shallow ; if the seed is deeply buried the Onions will be forced out of their true form and resemble Leeks. Where the crop has to be irrigated, seed is sown or planted on the sides of ridges, so that the water may run between the rows.

To ensure perfect ripening of the bulbs in Western Europe, it is customary to arrest growth by bending over the tops. The same result is attained in dry climates by withholding water.

For a domestic supply in India, Burma, Ceylon, the West Indies, and Central Africa, sowings may be made at regular intervals of fifteen days from the beginning of August, the earliest sowings to be all drawn for use in the green stage ; the later sowings to be thinned out, leaving a standing crop to become ripe.

September is the season for sowing maincrops of Onions in Victoria and New South Wales, but for early supplies seed may be sown from March onwards. In New Zealand the middle of August is the favourite time for sowing main crops ; for green Onions, seed is put in until January ; while those who transplant in September secure seedlings from sowings made in March or April. In Queensland and tropical Australia it is usual to sow in March, which is the beginning of the cold season.

In South Africa early crops of Onions are sown in February, March, or April, for transplanting in April and May. For field culture, August and September is the sowing period, and the plants are thinned, but not transplanted.

October is the sowing time for main crops in Egypt, Algiers, and Morocco, but for green Onions seed is sown the year through.

In China, Japan, India, Kashmir, and Ceylon, at an altitude exceeding 5,000 feet, Onion seed may be sown in March and April for main crops, and until June for salads.

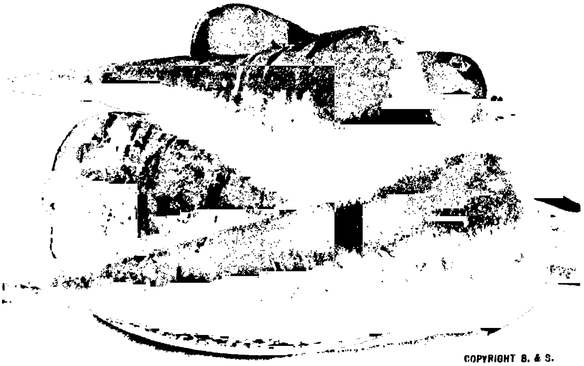
For the temperate districts of South America, sowings are recommended in September for main crops, and in March and April for transplanting in September. In the Argentine Republic, from February to August, and again from November to January, are the two sowing periods.

Pickling Onions are obtained by sowing the smaller silver-skinned varieties on comparatively poor soil which has been made fine and smooth, and the crops are allowed to stand very thick on the ground. The months named for sowing main crops will be suitable, and if necessary water must be given by hand at short intervals.

PARSNIP

PASTINACA SATIVA

German, Paſtinake. French, *Panais.* Dutch, *Pastinak.*
Spanish, *Chirivia.*



COPYRIGHT S. & S.

THIS valuable root is seldom met with in tropical countries, although there is no reason for its absence beyond the fact that the seed loses vitality more quickly than many other imported seeds. Against this liability, however, it is easy to provide by obtaining new seed annually. Until sowing time it should be stored in stoppered bottles or screw-capped tins.

The Parsnip has a flavour which is greatly relished by those who have been accustomed to it. As an article of food it is wholesome, highly nutritious, and in temperate climates it is a favourite autumn and winter vegetable, especially in association with corned beef.

The roots grow freely in any deeply worked loamy soil. The rows should be eighteen inches apart, but in warm climates the roots seldom attain the size of Parsnips grown in England, and a space of five or six inches between the plants in the rows is generally sufficient. Irrigation is necessary where the rainfall is inadequate, and in dry climates one inch of water weekly will be required.

Near sea level in tropical countries it is wise to defer sowing till November, and from seed got in during that month fairly developed roots may be anticipated by the end of January. It is always unsatisfactory to transplant Parsnips.

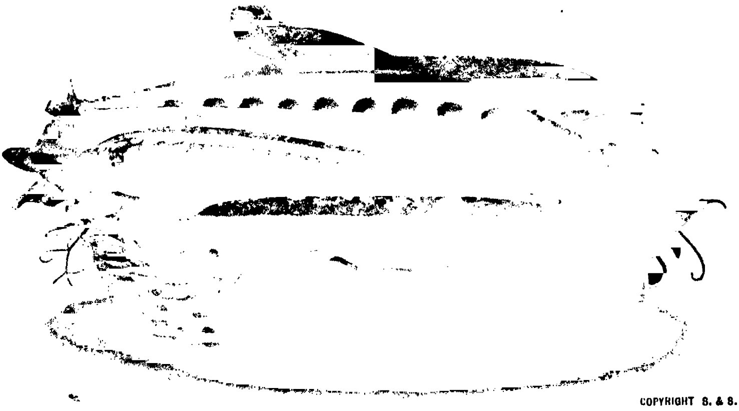
In Egypt, this root is successfully grown from seed sown in October and November. The same season is suitable for South Africa and southern latitudes in Australia and South America. For northern Australia, April is the date for sowing. In the Deccan, at an altitude of 2,000 feet, seed is sown in August.

GARDEN PEA

PISUM SATIVUM

German, *Erbſen.* French, *Pois.* Dutch, *Erwten.*
Spanish, *Guisantes* (Spain), *Arvejas* (Argentina).

PEAS are essentially a summer luxury. The first dish is never ready too soon, and should a prolonged drought, or want of forethought, bring the supply to a premature end, it invariably provokes expressions of disappointment. In British gardens the entire work of the year is frequently judged by the success achieved in maintaining a long succession of Peas. Where the necessary facilities exist, it is customary to forward the earliest crops by resorting to pot-work and the assistance of orchard houses. In tropical and semi-tropical climates artificial aid of this kind would be superfluous. But the mere fact that among local gardeners there is always a keen struggle to be first with early Peas is proof of the great esteem in which this vegetable is regarded in every household.



COPYRIGHT S. & S.

The list of varieties is very extensive, and every year witnesses an increase in the number. For the present purpose it will be needful to refer to two distinct classes—the round-seeded and the wrinkled-seeded Peas. Until recently the former predominated, but since the striking success obtained by a few specialists, the wrinkled-seeded varieties have deservedly come into favour, and are never likely to lose the premier position. There is no comparison between the two classes as to quality. The superior flavour of marrowfat Peas is acknowledged on all hands. Formerly, early varieties belonged exclusively to the round-seeded section. The only advantage that can now be claimed for this class is a slightly hardier constitution, and for market work in temperate countries this is not to be despised. For the household, however, marked preference is shown for Peas having the rich flavour which distinguishes the marrowfats, and some of them possess this quality in a higher degree than others. Marrowfat Peas now range from about ten inches to several feet in height, and in this respect alone a wide selection is possible. In other characteristics, such as productiveness, size of pods, size and number of individual peas, and general excellence, the world has never been so rich in the Pulse tribe as at the present moment.

For a vegetable so highly valued, every reasonable effort should be made to ensure favourable conditions. At the outset it must be clearly understood that Peas will not thrive on poor land. The soil must be deeply dug and heavily manured. A thick layer of rotten stable or farmyard manure should also be placed a few inches below the soil on which the rows are to stand. Shallow trenches are advisable because the crop then has the full benefit of rain or irrigation.

It is the practice in some countries to sow Peas in double rows, about nine inches apart, and to allow wider spaces between these double rows. This method of growing Peas seriously restricts the productive character of the plant. A single row, if generously treated, will branch out to a considerable width, and yield a far more satisfactory return than the crowded plants of double rows.

Good results are obtained by digging trenches at a distance of six feet apart, and allowing the intervening spaces to lie fallow, or to be used for Lettuces or other quick-growing ground crops between the rows of Peas. By this system, should manure be scarce, all the available dressing can be devoted to the lines on which the Peas stand.

In Central Africa, Burma, Ceylon, India, and the West Indies, at an altitude of 2,000 to 4,000 feet, the sowing season for Peas begins with the advent of the rainy season in June;

earlier where irrigation is abundant and facilities for shading are at hand. Shading is an important matter, entirely dependent on local circumstances. It must interfere neither with the free circulation of air, nor with the admission of sufficient light to maintain robust growth. Above 4,000 feet, sowings may commence in March or April, always assuming that water in abundance is available. Weekly sowings of the round varieties may be repeated until August, and then wrinkled-seeded Peas should be preferred. For tropical work, those which grow tall had better be avoided ; the provision of stakes to support the plants may prove a serious difficulty.

Breaks in the rainfall may jeopardise the crop, unless growth can be maintained by artificial aid. In the absence of rain, at least half an inch of water over the surface, at intervals of three days, must be supplied.

At sea level in the countries already named, the heat and moisture are too great for Peas until early in November, when sowings begin and are repeated until Christmas.

In Victoria and New South Wales the sowing period extends almost through the year. For early supplies April and May in warm dry situations ; June for main crops ; and from July onwards the sowings will need plentiful watering. Mulching the rows on both sides with decayed manure will help to sustain the plants.

In South Africa early sowings are made in August and September ; medium varieties in February and March ; and late crops in May and June. Sowing in two-inch furrows that have been abundantly watered is advised for summer, and shallow sowing for winter crops.

Fortnightly sowings from early in October until the end of November are recommended for Egypt. With irrigation the round-seeded Peas may be sown until February.

The sowing period in the Argentine Republic extends

COPYRIGHT
S. & S.

from the beginning of May for early varieties to the end of November for the latest kinds. In temperate South America main crops are sown in September and October, and with shelter early sorts may be put in during August.

Garden Peas have many foes, and of these the most insidious is mildew. Numerous remedies have been proposed; some futile, others dangerous. Bordeaux mixture will kill mildew if brought into actual contact; but it is a serious matter to recommend the application of poisonous oxide of copper to a crop of Peas the pods of which have to be handled. The attack of mildew generally occurs during drought. As a preventive, the roots must be kept moist by at least one inch of water per week in hot dry climates; a smaller quantity will suffice where occasional showers fall. Should mildew obtain a start, syringe with water not exceeding 150° F. (65° C.). The temperature should be tested by a thermometer instead of trusting to the deceptive judgment of the hand. Plants that have been crowded under nursed conditions will scarcely bear so high a temperature.

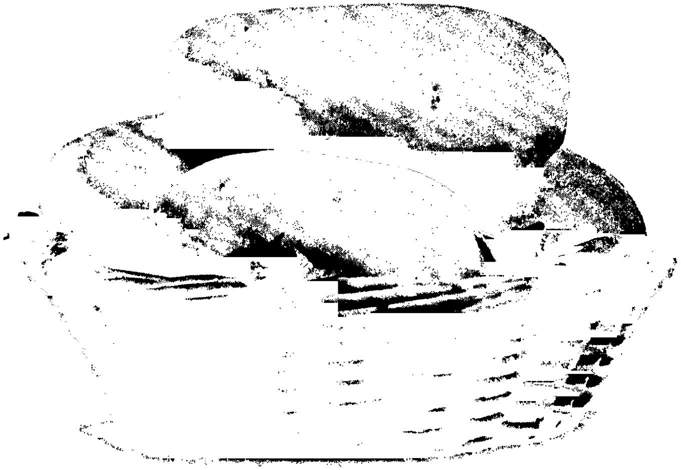
Crows, sparrows, and squirrels are all destructive to Pea crops, and a boy who will keep moving should scare them.

THE POTATO

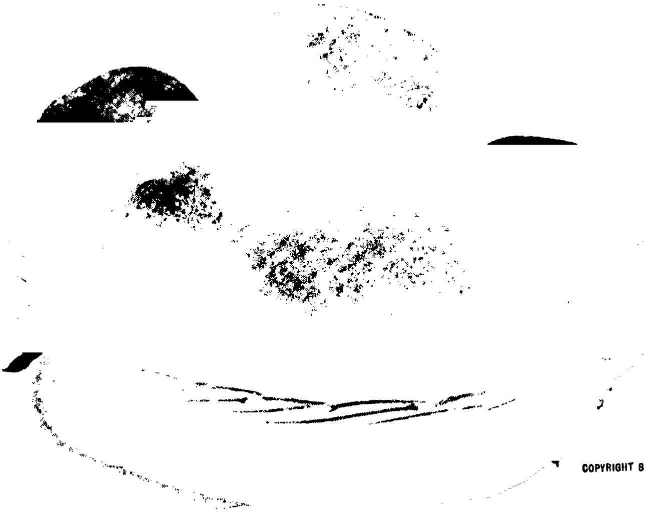
SOLANUM TUBEROSUM

German, Kartoffel. French, *Pomme de terre.* Dutch, *Aardappel.*
Spanish, *Papa* (used in Colombia only), *Patata* or *Batata.*

A CONSIDERABLE number of vegetables are naturally in season for periods more or less brief every year. But the Potato, either as a new crop or as stored tubers, furnishes a constant supply of food through the whole twelve months. In association with animal food it appears on well-served tables every day, and as Potatoes are deficient in flesh-forming



COPYRIGHT S. & S.



COPYRIGHT S. & S.

constituents, the alliance is both healthful and nutritious. The natives of India find in this crop a wholesome food which is not barred by their religious creeds, and as a marketable article it is no longer restricted to Europeans.

To state the countries or districts where Potatoes thrive would require a formidable list. It is easier to indicate the conditions under which this crop does not flourish. In climates that are continuously warm and moist—especially at night—Potatoes, if planted, develop roots and produce foliage, but no tubers. In other cases tubers may form, although they fail to attain maturity. The produce never arrives at the resting stage, and for the table the Potatoes prove to be most unsatisfactory.

Another point is of importance. It may be necessary to import tubers every alternate year. This is the case in Southern and Central Africa. Imported tubers, of suitable varieties, yield a splendid crop in the first season. The produce, if planted, may also give a paying crop. Beyond this the depreciation is so rapid that experienced growers do not risk a third generation. As a consequence, thousands of tons of seed Potatoes are annually consigned to the Cape by British growers.

The Potato is not over-fastidious as to soil. Light sandy loams are suitable, most economical in labour, and they yield the earliest crops. Loamy clay will also grow Potatoes, but in some districts, especially with certain varieties, the tubers are flavourless, and may even be watery in texture. In tropical climates soils of this character are more profitable under wheat or cotton. Where it is possible to select a position for the crop, choose an open, breezy situation, which quickly cools after a hot day.

The soil must be in good condition, but the heavy dressings of manure usual in England are scarcely desirable under a tropical sun. Fifteen tons of town sweepings is sufficient per acre, and the ash of brushwood is of especial value, because it contains a considerable proportion of potash, which should always be a prominent constituent in the manure for a Potato crop.

At an altitude of 4,000 feet and upwards, the Potato does well within 7° of the Equator; and at a lower altitude if further north or south of the Equatorial line.

At about 12° north, the Potato thrives at an elevation of 3,000 feet; and at 19° north, less than 2,000 feet is sufficient to produce the very large supplies for the Bombay market. Beyond question, however, the quality of Potatoes, grown at the degrees named, improves at the higher altitudes.

Small tubers may be planted whole; or larger tubers can be divided, taking care that at least two or three eyes are left in each cut portion. For tropical work it is of great consequence to secure tubers that have been perfectly ripened.

Potatoes are occasionally raised by sowing seed saved from well-known stocks. In the first year the tubers are very small, but if carefully stored, and planted in the following season, a crop worth lifting may be realised.

RADISH

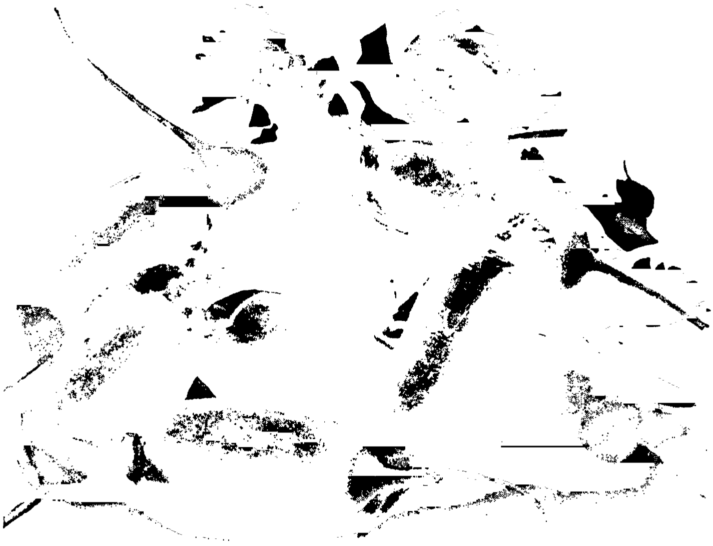
RAPHANUS SATIVUS

German, Rettig; Radieschen. French, *Radis; Rave; Petite Rave.*
Dutch, *Radijs.* Spanish, *Rabano; Rabanillo.*

WITHIN the last two decades there has been little short of a revolution in the various forms of this crisp and delicious salad. When tastefully arranged, a dish of some of the most attractive European Radishes is quite an ornament to the table.

There are no difficulties in the culture. Throughout the year in warm climates it is easy to secure a continuous supply of bright and attractive roots. Fitness for use will vary between fifteen and thirty days from the date of sowing, and rapid growth always ensures crisp and tender roots which are exceedingly delicate in flavour.

Any good friable garden soil, finely broken up, is suitable for growing Radishes. The position of the beds should, however, be chosen with judgment. Early crops, after a cold winter, are raised in frames, which in a low temperature need the protection of mats at night. Succession crops are sown on sunny borders, sheltered from cold winds. Warm weather crops, on the contrary, are grown in the coolest position available, where they are not allowed to suffer from direct sunshine.



COPYRIGHT S. & S.

At sea level in the tropics, frame culture is also necessary during the monsoon. The lights must be arranged to admit a free circulation of air, while affording protection from torrents of rain, and shading will prevent injury from occasional outbursts of fierce sunshine. Beds can be arranged for irrigation during dry weather, or they may be raised to allow excessive rain to run off.

The regulation of an adequate supply of water, and no more, needs watchfulness and judgment. A heavy shower, which sets the surface almost like cement, may leave the soil dry beneath the top crust, and render it necessary to give water a few hours later.

Sowings should be regularly made at weekly intervals; and immediately a plot is past its prime, the standing crop must be dug in.

The accommodating nature of the plant enables European ladies residing in the East to grow Radishes in boxes of soil on the flat roofs of their dwellings ; the requisite watering and attention afford a healthful and interesting occupation during the long hot days. For filling the boxes, road-scrapings, or the dried mud swept from the nearest road, will answer the purpose. In Ceylon, Radishes are grown in the pure white sand taken from the Cinnamon gardens, enriched with a few spoonfuls of a suitable artificial manure. Beautiful roots are produced on verandahs, and as the colour of the sand is not an essential feature, this simple method may be adopted with advantage in other districts.

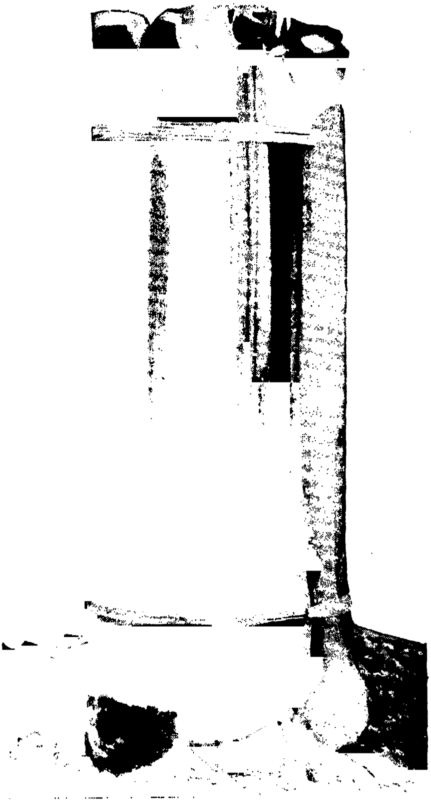
RHUBARB

RHEUM HYBRIDUM

German, Rhabarber. French, *Rhubarbe*. Dutch, *Rhabarber*.
Spanish, *Ruibarbo* ; *Ruibarbo híbrido*.

THE wild Rhubarb, from which it is believed the cultivated varieties were originally derived, grows on the Himalaya Mountains, and in temperate climates which have a cold winter. It may therefore be assumed that under similar conditions, although in widely separated quarters of the globe, this plant can be successfully grown.

In the United Kingdom and European countries, Rhubarb is propagated by dividing the roots, and this is the only method of keeping the several varieties true. These divisions are somewhat bulky and need special packing to ensure safe transit. The period for exportation is limited to three months—from November to January. After growth commences it is unsafe to ship roots. Seed can, however, be sent cheaply by post, or in hermetically sealed cases, at any time of the year. And although plants raised from seed, however carefully saved, cannot be relied on to come entirely true to name, the produce is generally so satisfactory that the culture of Rhubarb from seedlings deserves to be more extensively practised.



The structure of the plant, with its enormous leaves, immense stalks, and rapid growth, will naturally lead to the conclusion that a very rich deep loam, abundantly dressed with good manure, is necessary to maintain luxuriant growth. Unless favourable conditions can be ensured the crop will be of little value. Stable manure must be used very liberally, not less than one ton for every hundred square yards of land. To this may be added fish offal, phosphatic manures such as dissolved bones, fish guano, and potash in any form.

Seed can be sown in lines one foot apart, the plants to be thinned to a distance of one foot in the rows. In the succeeding spring carefully transplant, allowing a space of two feet each way, and mulch the ground with a thick covering of stable litter. During the growing season the most promising plants should be marked with stakes, in which notches can be cut to indicate the order of preference. In the following year, as many of the best roots as are wanted should be planted out at a distance of three feet. At every stage the necessity of generous treatment, and sufficient water, must be borne in mind.

Forcing is effected by inverting barrels over the crowns, filling the spaces between the barrels and covering the tops with stable litter.

Excessive gathering is to be avoided, or the penalty will be paid in the following season by feeble growth or the destruction of the plant.

Rhubarb flourishes throughout Europe, in Canada, China, North Japan, Kashmir, the Himalayas, Asiatic Russia, and the southern districts of South America. In fact, this wholesome substitute for fruit may be cultivated with success and profit wherever the Apple tree bears fruit abundantly.

SALSIFY

TRAGOPOGON PORRIFOLIUS

German, Hafer- or Weißwurzel. French, *Salsifis*. Dutch, *Boksbaard*.
Spanish, *Escorzonera*.

ON the Continent of Europe Salsify is very highly esteemed, and in the United States it is commonly known as the Vegetable Oyster. The latter designation is due to the skill of the cook, rather than to the inherent flavour of the root. The proper method of preparing this delicacy is to scrape the roots, steep them in water containing a little lemon juice, and boil until quite tender. They may be served with white sauce, or the cooking can be carried a step further for a dish of Vegetable Oyster. This is obtained by allowing the roots to become cold, when they are cut in slices, fried quickly in butter to a light golden brown, and dusted while cooking with salt and white pepper. They are sprinkled with crisped parsley and served with sauce made from butter, flour, and the liquor from fresh or tinned oysters.

The object to be aimed at by the gardener is clean, handsome roots. When badly grown they are frequently fanged, and this lowers the quality. Trenches answer best for the crop, and the soil should be rich, friable, and free from recent manuring. If manure must be added, it should be placed at the bottom of the trench, and be covered with a sufficient depth of soil to grow long clean roots.

Seed is sown in spring in drills one inch deep, and the plants are subsequently thinned to about ten inches apart.

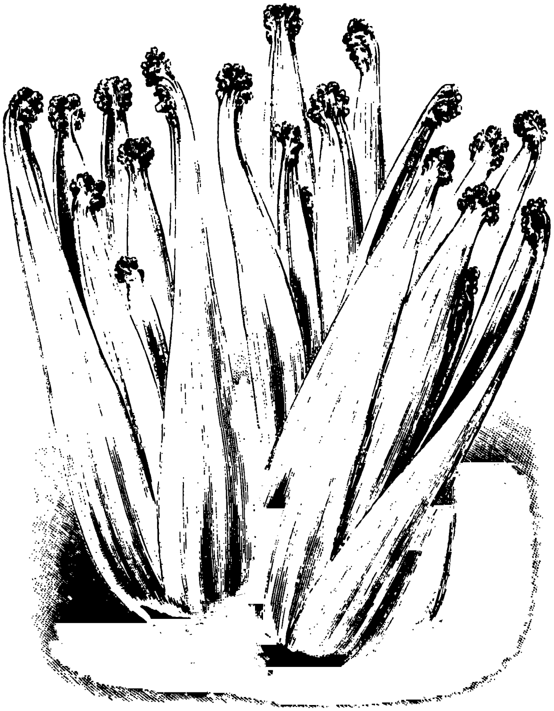
When ready, the roots may be lifted and stored in sand until wanted. Or they can be left for the flowering shoots to rise to a height of five or six inches. These furnish a distinct dish if cooked and served in the same manner as Asparagus.

Scorzonera (*S. hispanica*).—This root is similar in character to Salsify, but it is darker in colour and rather more troublesome to grow.

SEA KALE

CRAMBE MARITIMA

German, See- or Meerkohl. French, *Crambe ; Chou-marin.* Dutch, *Zeekool.*
Spanish, *Col marina ; Crambe maritima.*



COPYRIGHT S. & S.

SEA KALE is a native of the British Isles, and is widely cultivated as an early and most welcome spring vegetable, The crowns, after they are blanched, have a distinct flavour, which is greatly appreciated in almost every European and American household.

Roots are only in a fit condition for travelling long distances during the resting state, from November to January inclusive. But seed can be despatched by post in every month of the year, and as the seedlings come quite true to character, it is most convenient in the Colonies and India to begin the culture with seed.

A deep strong loam, in a sunny position, is desirable. Sandy soil is never rich enough to do the crop justice, and must have a very heavy dressing of stable manure.

The simplest mode of culture is to dig trenches to a depth of two feet, and during the progress of the work plenty of manure can be incorporated. As the blanching of the crowns necessitates a considerable space and much traffic, a distance of about four feet should be allowed between the trenches. Seed is sometimes sown in lines on the prepared ground, but the better plan is to sow in groups two feet apart, and thin to three plants in each group. If sown at the beginning of the season, the crowns will be fit for blanching in the following spring. The soil between the trenches can be utilised for short-lived crops, such as Lettuce or any vegetable or salad that can be quickly cleared. During the growing season the vigour of the plants must be maintained by rich mulchings, the free use of water, and liquid manure.

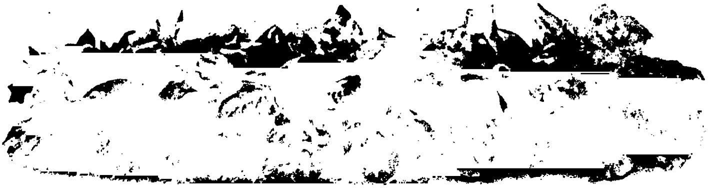
Blanching may be accomplished by means of boxes, barrels, or large inverted pots; but best of all by Sea Kale pots made expressly for the purpose. The important point is to secure absolute darkness. To effect this leaves are placed between, and are also heaped high above the boxes or pots. Slight fermentation sets in, and a mild forcing temperature is created that favours the growth of fine heads. In the absence of leaves, stable manure is the most efficient substitute. An occasional inspection is necessary, and after every such visit the covering must be carefully restored. Very little light will colour the crowns and spoil the flavour.

When the heads have been cut, remove the bulk of leaves or manure and gradually admit light and air, with a view to the next year's supply. Plants which are not forced must also have the crowns cut away, or they throw flowering stems, and are incapable of producing heads in the following season. Round each cut stem a number of eyes always form. These are all to be rubbed away, except the strongest, which will develop a crown for the succeeding year.

SPINACH

SPINACIA OLERACEA

German, Spinat. French, *Epinard.* Dutch, *Spinazie.*
Spanish, *Espinaca.*



COPYRIGHT S. & S.

SPINACH is probably enjoyed with even more relish in India and the Colonies than it is at home ; perhaps because it is less accessible. The crop is easily grown in countries subject to the south-west monsoon, by sowing in rows one foot apart at the beginning of the cool season. Select a well-tilled border, thin to six inches in the rows, and irrigate regularly. In the absence of water the plants remain small, and soon start seed-stems; but when liberally grown, the dark, broad, luxuriant leaves yield admirable dishes of Spinach of full rich flavour. For tropical work the Round-seeded variety is to be preferred.

In Southern Australia the Prickly-seeded Spinach is generally sown from March to May, and the Round-seeded variety in August and September.

In Egypt the Round-seeded can be sown throughout the year by selecting suitable positions, according to the season. A sheltered spot may be necessary, or full exposure to the sun. Irrigation is, of course, assumed.

Spinach may be sown in the temperate climates of South America and South Africa in August and September.

New Zealand Spinach (*Tetragonia expansa*).—This plant flourishes in a temperature that renders ordinary Spinach worthless, and it is preferred by some persons who object to the slight bitterness of flavour which distinguishes the true article. Allowing for the fact that the New Zealand variety endures greater heat with impunity, it will grow in the same countries and under conditions similar to those already indicated.

Perpetual Spinach, or **Spinach Beet** (*Beta Cicla*).—Although this is a true Beet, the roots are worthless, but it offers a compensating advantage in the leaves, and the culture should be liberal, with the object of developing the leafy part of the plant. In England, when hot summers force ordinary Spinach to run to seed, Spinach Beet produces a succession of leaves which are an excellent substitute. Sow at the commencement of the season in rows one foot apart, and thin to a distance of six or eight inches in the rows. When the leaves are ready for gathering they must be pulled, whether wanted or not, to promote new growth. By this practice a supply of young tender leaves is maintained.

STRAWBERRY

FRAGARIA

German, Erdbeere. French, *Fraise.* Dutch, *Aardbezie.* Spanish, *Fresa.*

COPYRIGHT S. & S.

ALPINE STRAWBERRY

In every well-ordered kitchen garden the culture of Strawberries forms an important feature in the rotation of crops. This is the justification for alluding to a popular fruit in a series of notes on the culture of vegetables.

The method of propagating Strawberries in the United Kingdom and on the Continent of Europe is almost exclusively by runners taken from named varieties. The chief exception is the Alpine Strawberry, which is fruited from seedlings obtained by sowing seeds annually, and these come quite true to character. Seed is also saved from several of the named varieties, and as the shipment of runners is both costly and hazardous, the more convenient course of exporting seed is generally adopted. It is scarcely necessary to state that seedling Strawberries do not produce fruit of the even character which is obtained from plants established in the regular way by runners. A wide difference in size, form, and perhaps in flavour, may be expected. But when this admission is made, it is still true that Strawberries grown from seed make a full return for the comparatively little time and trouble they entail. The plants which prove to be of superior quality, and there is generally a fair proportion of them, can afterwards be propagated by runners, or the parent plants may be divided.

Strawberries do not thrive on loose soil, and are therefore rarely satisfactory on land of a sandy texture. A fine loam which settles down into rather a hard bed will grow the fruit to perfection, but it must be thoroughly drained.

In tropical countries seed can be sown from August to October on good land, enriched by the free addition of leaf-mould or stable litter. Germination is slow and capricious. When the plants are large enough to handle they should be transferred to another prepared bed, allowing the seedlings a space of four inches each way. Shade will be necessary, and, in the absence of rain, water must be given regularly as the season demands. In the following spring, the plants should be lifted with all the roots perfect, and transferred to the fruiting beds in rows two feet asunder, allowing each plant a space of eighteen inches in the rows.

Before the plants come into bearing, the ground should be thickly covered with perfectly clean litter which will not impart a flavour to the fruit.

In all temperate countries, Strawberries can be grown with ease, and in tropical lands the plant flourishes from the sea level to an altitude of 4,500 feet.

TOMATO

LYCOPERSICUM ESCULENTUM

German, Liebesapfel; Tomate. French, *Tomate.* Dutch, *Tomaat.*
Spanish, *Tomate.*

ALTHOUGH the Tomato did not secure a hold on European public favour until the nineteenth century was far advanced, it has long been highly esteemed in tropical countries, where it grows like a weed, and may frequently be seen on heaps of manure.

Since skilled horticulturists have taken the plant in hand, much has been done to improve the quality, enhance the beauty, and increase the attractiveness of this refreshing esculent. The fruits of several varieties are exceedingly ornamental, both on the plants and when cut. In England, it is not at all uncommon to see a dinner table decorated with racemes of the smaller crimson- and amber-coloured Tomatoes. And it is unquestionably true that those which are now preferred in Europe are far superior in quality to older Eastern strains, which are only acceptable until finer varieties have been introduced.

In temperate climates the culture of Tomatoes must, to a large extent, be conducted under artificial conditions. Fruit is ripened freely during warm summers in borders, but the plants have to be prepared under glass, and, in the most favourable seasons, supplies from the open are restricted to a few weeks of the year. These altogether fail to meet public requirements. A constant succession is wanted, and when short days and deficient light render it impossible to ripen fruit, even with the aid of glass and fire-heat, immense quantities are imported from a distance. For a sea voyage Tomatoes must be cut before maturity, and at best they are a poor substitute for fruits finished on plants at home.

COPYRIGHT S. & S.

A brief statement of the conditions under which Tomatoes are successfully grown in England will enable residents in the Colonies to determine whether this luxury is within reach, under natural conditions, or by such aids as may be at hand.

There need be no anxiety concerning soil. Any fairly good sandy loam will answer for the seed-pans or beds. If the loam is somewhat stiff, an admixture of sand or road-sweepings will reduce it to a friable state. Leaf-mould, or any thoroughly decayed manure, rich in potash, is suitable; but fresh stable litter should be avoided. Such artificials as nitrate of potash, dissolved bones, and lime can be used in the absence of other manures.

As to temperature, less than 55° F. (13° C.) by night will be destructive, and by day a high figure should be avoided. In this connection, shade, free circulation of air, and constant moisture at the roots without excess, all contribute to healthy growth.

Seed should be thinly sown at the opening of the growing season, followed by further sowings to maintain a succession of crops as the climate may permit. The natural sowing season of any country or district may be anticipated by a month or two, where facilities exist for bringing forward seedlings under glass. Immediately the young plants can be handled, they should be transferred to pans or beds in such a way as to avoid a check. If convenient, the first removal may be into separate pots in readiness for transplanting to fruiting quarters.

It is usual to reduce plants grown under glass to one, two, or three fruiting stems, and the spacing depends on the number. Plants in rows three feet apart will admit cordons at a distance of two feet in the lines. More space is requisite for plants having two or three branches, and for all of them supporting stakes are necessary. When the number of stems has been decided, they should be allowed to develop fully but all the lateral shoots must be pinched out as they appear The practice of partially denuding plants of their foliage is

COPYRIGHT S. & S.

determined by the duration and intensity of sunny hours, and the near maturity of the crop. On this point it would only be misleading to state a definite rule for varying conditions.

Should the fruit fail to set naturally, artificial fertilisation must be resorted to. Any means which brings the pollen into contact with the stigma of the flower is effectual. It has often been observed that when the early flowers have set, others give no trouble.

In tropical countries, where seeds are sown on beds of rich soil, the ground is saturated with water. When the surface has dried, lines are marked by pressing the handle of a hoe or rake across the bed at intervals of six inches. The seed is thinly sprinkled on these lines, covered with fine soil and watered daily. Before the plants appear, land is prepared in ridges, and when the seedlings attain a height of four inches they are planted in alternate furrows, which are arranged to allow a space of three feet between the rows of plants. Earthing up and regular watering will, of course, be necessary, and occasionally it will stimulate the plants to substitute liquid manure for plain water.

GARDEN TURNIP

BRASSICA RAPA

German, Speiſe⸗Rübe. French, *Navet potager.* Dutch, *Raap of Knol.*
Spanish, *Nabo gordo ; N. redondo ; N. gallego.*

In countries where frosts are prevalent during winter, the culture of Turnips for household use is a comparatively simple procedure.

Any really good light loam is suitable, and if it happens to have been heavily dressed for some previous crop, no immediate application of manure will be necessary. But Turnips will not thrive on land which is deficient in lime.

This mineral in abundance is absolutely necessary for the well-being of all the Brassicas, including Broccoli, Cabbage, Cauliflower, and Turnips. Where the available supply of lime is inadequate, Cabbages are stricken with Club-foot, and

Turnips are reduced to worthlessness by Finger-and-toe. The best precaution is to avoid soil known to be unsuitable, and, in the event of doubt, to give the land a liberal dressing of lime in the preceding autumn. The expense will not be wasted in any case, for lime is a great sweetener, and it sets up chemical action which almost always enhances the fertility of the land.

At the opening of the growing season the earliest Turnips are obtained from beds protected by glass. The beds are made on heaps of manure, which by fermentation yield sufficient heat to maintain growth when the natural temperature is below the freezing point. If necessary, mats are spread over the glass in the evening and removed in the morning. At every opportunity free ventilation is given to keep the crop in health. By this arrangement tender roots, sufficiently large for the kitchen, are easily obtained. Successive sowings, on a scale commensurate with daily requirements, should follow until supplies come in from the borders. The object to be attained is a continuous succession during spring, summer, and autumn. The latest crops will, of course, be lifted and stored for winter use while vegetation is dormant.

Beds and borders for Turnips should be prepared by roughly digging the ground in autumn, and leaving it to the fertilising influences of wind, rain, frost, and snow. When seed-time comes, it will be an easy task to break the surface down to a friable state, and make it firm and level in readiness for the seeds. Choose a sheltered sunny border for the first out-door crops; but as the season advances a shady spot will be an advantage. Should watering become necessary, enough must be given to go down to the roots. Mere surface sprinklings are harmful by promoting leaf-growth, while the roots make little or no progress.

Seed is sown in drills about fifteen inches apart. The plants are thinned gradually until they finally stand at a distance of ten inches or a foot. In the process of thinning, many dishes of sweet little Turnips can be sent into the house. For the table no attempt should be made to grow large specimens ; these are never equal in quality to roots of small or moderate size, quickly grown.

Where night frosts are unknown, Turnip seeds can be sown at brief intervals in the cool season. In such countries a dry wind frequently prevails in the evening, and if the crop is watered near the close of the day, rapid evaporation follows and the plants become frozen, although the thermometer may register a temperature far above the freezing point. In Australia, South Africa, and Eastern Europe, at a distance from the sea-board, much loss is sustained from this cause.

In the tropical zone, where spring opens hot and dry, and rain seldom falls before June, and heavy showers usually alternate with hot sunny intervals, no advantage is to be gained by sowing Turnips before August. By that date the soil becomes cool, the sky is frequently clouded, and at an altitude of 2,000 feet seed may be sown fortnightly up to January. Nearer the sea level it is useless to begin until September or October, and in some districts November will be the earliest month for sowing.

For New South Wales, the usual months for getting in Turnip seeds are February and March, and again in November, should there be an opportune fall of rain. In Victoria, under favourable circumstances, a beginning is made in November, and successional sowings follow until May. From June till November is the period for New Zealand. In South Africa the earliest time is August or September ; the mid-season January and February ; and for late crops March and April. The sowing season in Egypt begins in October and extends until February. And in the Argentine Republic, Turnips may be successfully grown from sowings at almost any date in the year.

VEGETABLE MARROW

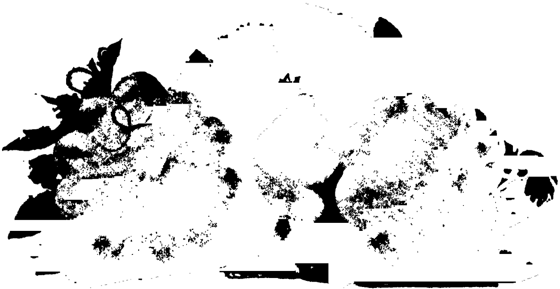
CUCURBITA PEPO OVIFERA

German, Kleiner Kürbiß. French, *Courge à la moelle.*
Dutch, *Vroege of Groene Pompoen.* Spanish, *Curga ovifera cogurda.*

WHERE a climate at all resembling that of the United Kingdom is experienced, the Vegetable Marrow is exclusively a summer vegetable. The plant is tender and perishes under the first touch of frost. With the exception of the Bush varieties, which do not spread over much ground, the vines ramble, sometimes to a surprising extent, and occasionally it is necessary to pinch out the leading points to prevent injury to neighbouring crops. The essential conditions are very rich porous loam, plenty of moisture, and abundant sunshine.

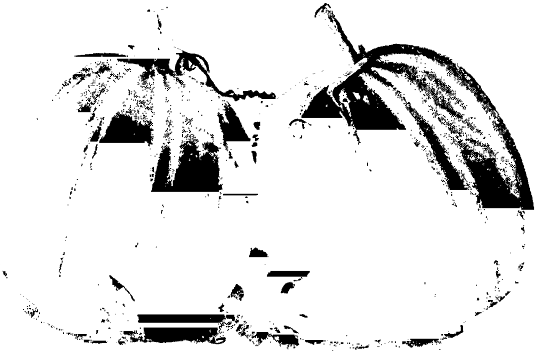
With some growers large Marrows appear to be the chief ambition. On economic grounds this is quite a mistake. A single plant is incapable of developing more than two or three immense fruits, and these are of little value for the table. But scores of small Marrows, of the highest quality, may be cut from one plant. To enjoy them in perfection they ought not to exceed a few inches in length, and when cooked entire, as they should invariably be, the whole of the delicate flavour is retained. When the plants are in bearing, the fruits need to be regularly cut as they attain a suitable size. If not wanted, give them away; by this practice productiveness is maintained until cold weather puts a stop to it.

Where the temperature in spring is liable to sudden depressions, especially at night, it is usual to raise plants in separate pots under glass, in readiness for transfer to open beds on the advent of warm weather. For countries having a cold wet spring, seed protectors of many kinds are used.



COPYRIGHT S. & S.

COPYRIGHT S. & S.



COPYRIGHT S. & S.

Perhaps the simplest is a sheet of glass, supported on four pegs, held in position by wire clips. These sheets of glass are sloped gently towards the sun, and ventilation is perfect.

Those who are familiar with the business start their Marrows on long beds, made on the top of fermenting manure, placed in pits dug out for the purpose. The usual depth is eighteen inches, and about nine inches of the soil is placed on the manure. Seed is sown in groups at intervals, and the weakest plants are thinned out until one, two, or three are left at each station, as may be determined. Whether these groups have protection of any kind will depend on the climate and date of commencing operations. After the plants make a start, growth is extremely rapid, and the supply of water must be regular and sufficient. On the first appearance of fruit, liquid manure should be substituted for water.

In Egypt seed may be sown in pots during March; the pots can be placed under shelter of walls made of sun-dried bricks, and the plants will be ready for beds in April. September and October are the usual months for sowing in Tasmania, New Zealand, Southern and Western Australia, the temperate climates of Florida and South America; also for Madeira, Malta, Persia, and Rhodesia.

In Canada, the Himalayas, Kashmir, China, and Japan, Marrows should be sown immediately on the disappearance of frost, or earlier on a hot-bed, with mat protection at night.

At an altitude of 2,000 to 3,000 feet in India, sowing commences in June, when the soil has been cooled by the first showers, except in districts subject to heavy rainfall. Near sea level October is the usual month, unless the north-east wind prevails; in that case the sowing period is February and March.

The three illustrations of Vegetable Marrow on page 114 are reproduced from photographs of Improved Custard, Cream-coloured Oval, and Sutton's Perfection.

THE ROTATION OF CROPS
IN THE
VEGETABLE GARDEN[1]

THIS is a subject worthy the attention of those who aim at the largest possible production and the highest possible quality of every kind of kitchen-garden crop, for it concerns the natural relations of the plant and the soil as to their several chemical constituents. The principle may be illustrated by considering the demands of two of the most common kitchen-garden crops. If we submit a Cabbage to the destructive agency of fire, and analyse the ashes that remain, we shall find in them, in round numbers, eight per cent. of sulphuric acid, sixteen per cent. of phosphoric acid, four per cent. of soda, forty-eight per cent. of potash, and fifteen per cent. of lime. It is evident that we cannot expect to grow a Cabbage on a soil which is destitute of these ingredients, to say nothing of others. The obnoxious odour of sulphur emitted by decaying Cabbages might indicate, to anyone accustomed to reflect on ordinary occurrences, that sulphur is an important constituent of Cabbage. If we submit a Potato tuber to a similar process, the result will be to find in the ashes fifty-nine per cent. of potash, two per cent. of soda, six per cent. of sulphuric acid, nineteen per cent. of phosphoric acid, and two per cent. of lime. Now the lesson for the cultivator is, that to prepare a soil for Cabbage it is of the utmost importance to employ a manure containing sulphates, phosphates, and potash salts in considerable quantity ; as for the lime, that can be supplied separately, but the Cabbage must have it. On the other hand, to prepare a soil for Potatoes it is necessary to employ a manure strongly charged with salts of potash and phosphates, but it need not be highly charged with soda or lime, for we find but a small proportion of these ingredients in the Potato. There are soils so naturally rich in all that crops require, that they may be tilled for years without the aid of manures, and will not cease to yield an abundant return. But such soils are exceptional, and those that need constant manuring are the rule. One point more, ere we proceed to apply to practice these elementary considerations. In almost every soil, whether strong clay, mellow loam, poor sand, or even chalk, there are comminglings of all the minerals required by plants, and, indeed, if there were not, we should see no herbage on the downs, and no Ivies climbing, as they do, to the topmost heights of limestone rocks. But usually a considerable proportion of those mineral constituents on which plants feed are, as it were, locked up in the staple, and are only dissolved out slowly as the rain, the dew, the ever-moving air, and the sunshine operate upon them and make them available. As the rock slowly yields up its phosphates, alkalies, and silica to the wild vegetation that runs riot upon it, so the cultivated field (which is but rock in a state of decay) yields up its phosphates, alkalies, and silica for the service of plants the more quickly because it is the practice of the cultivator to stir the soil and continually expose fresh surfaces to the transforming power of the atmosphere. It has been said that the air we breathe is a powerful manure. So it is, but not in the sense that is applicable to stable manure or guano. The air may and does afford to plants much of their food, but it can only help them to the minerals they require by dissolving these out of pebbles, flints, nodules of chalk, sandstone, and other substances in the soil which contains them in what may be termed a locked-up condition. Every fresh exposure of the soil to the air, and especially to frost and snow, is as the opening of a new mine of fertilisers for the service of those plants on which man depends for his subsistence.

---

[1] Reprinted from Sutton's book on British Gardening entitled, 'The Culture of Vegetables and Flowers from Seeds and Roots.'

The application to practice of these considerations is an extremely simple matter in the first instance, but it may become very complicated if followed far enough. Here we can only touch the surface of the subject, yet we hope to do so usefully. Suppose, then, that we grow Cabbage, or Cauliflower, or Broccoli, on the same plot of ground, one crop following the other for a long series of years, and never refresh the soil with manure, it must be evident that we shall, some day or other, find the crop fail through the exhaustion of the soil of its available sulphur, phosphates, lime, or potash. But if this soil were allowed to lie fallow for some time, it would again produce a crop of Cabbage, owing to the liberation of mineral matters which, when the crops were failing, were not released fast enough, but which, during the rest allowed to the soil, accumulated sufficiently to sustain a crop. Obviously this mode of procedure is unprofitable and tends of necessity to exhaustion, although it must be confessed that utter exhaustion of any soil is a thing at present almost unknown. But, instead of following a practice which impoverishes, let us enrich the soil with manure, and change the crops on the same plot, so that when one crop has largely taxed it for one class of minerals, a different crop is grown which will tax it for another class of minerals. Take for a moment's consideration one of the necessary constituents of a fertile soil, common salt (chloride of sodium). In the ash of a Cabbage there is about six per cent. of this mineral, in the Turnip about ten per cent., in the Potato two to three per cent., in the Beet eighteen to twenty per cent. On the other hand, the Beet contains very little sulphur, but both Turnip and Beet agree in being strongly charged with potash and soda. It follows that if we crop a piece of ground with Cabbage, and wish to avoid the failure that may occur if we continue to crop with Cabbage, we may expect to do well by giving the ground a dressing of common salt and potash salts, and then crop it with Beet.

The whole subject is not exhausted by this mode of viewing it, for all the facts are not yet fully understood by the ablest of our chemists and physiologists, and crops differ in their methods of seeking nourishment. We might find two distinct plants nearly agreeing in chemical constitution, and yet one might fail where the other would succeed. Suppose, for instance, we have grown Cabbage and other surface-rooting crops until the soil begins to fail, even then we might obtain from it a good crop of Parsnips or Carrots, for the simple reason that these send their roots down to a stratum that the Cabbage never reached; and it is most instructive to bear in mind that, although the Parsnip will grow on poor land, and pay on land that has been badly tilled for years, yet the ashes of the Parsnip contain thirty-six per cent. of potash, eleven per cent. of lime, eighteen per cent. of phosphoric acid, six per cent. of sulphuric acid, three per cent. of phosphate of iron, and five per cent. of common salt. How does the Parsnip obtain its mineral food in a soil which for other crops appears to be exhausted? Simply by pushing down for it into a mine that has hitherto been but little worked, though Cabbage might fail on the same plot because the superficial stratum has been overtaxed.

Having attempted a general, we now proceed to a particular application. In the first place, it is proper to say that good land, well tilled and abundantly manured, cannot be soon exhausted ; but even in this case a rotation of crops is advisable. It is less easy to say why than to insist that in practice we find it to be so. The question then arises—What is a rotation of crops ? It is the ordering of a succession in such a manner that the crops will tax the soil for mineral aliments in a different manner. A good rotation will include both chemical and mechanical differences, and place tap-roots in a course between surface roots, as, for example, Carrots, Parsnips, and Beets, after Cabbage, Cauliflower, and Broccoli ; and light, quick surface crops, such as Spinach, to serve as substitutes for fallows. The cropping of the kitchen garden should be, as far as possible, so ordered that plants of the same natural families never immediately succeed one another ; and, above all things, it is important to shift from place to place, year after year, the Cabbages and the Potatoes, because these are the most exhaustive crops we grow. In a ton of Potatoes there are about twelve pounds of potash, four pounds of sulphuric acid, four pounds of phosphoric acid, and one pound of magnesia. We may replace these substances by abundant manuring, and we are bound to say that the best rotation will not obviate the necessity for manuring ; but even then it is well to crop the plot with Peas, Spinach, Lettuce, and other plants that occupy it for a comparatively brief space of time, and necessitate much digging and stirring ; for these mechanical agencies combine with the manure in preparing the plot to grow Potatoes again much better than if the land were kept to this crop only from year to year. If we could mark out a plot of ground into four parts, we should devote one plot to permanent crops—such as Asparagus, Sea Kale, and Rhubarb—and on the other three keep the crops revolving in some such order as this : No. 1, Potatoes, Celery, Leeks, Carrots, Parsnips, Beet, &c. No. 2, Peas, Beans, Onions, Summer Spinach, &c., followed by Turnips for winter use, Cabbage for spring use, and Winter Spinach.

No. 3, Brassicas, including Broccoli, Brussels Sprouts, Kale, &c. In the following year the original No. 1 would be cropped as No. 2, and No. 2 as No. 3. In the third season corresponding changes would be made, constituting a three-course system. The cultivator must use discretion in cropping vacant ground. As an example it will be obvious that land cleared of Early Potatoes will be very suitable for planting Strawberries. Another point is worth attention: Peas sown on the lines where Celery has been grown will thrive without any preparation beyond levelling the ground and drawing the necessary drills. This is a West of England custom, and it answers exceedingly well.

THE

CHEMISTRY OF GARDEN CROPS[1]

A CONSIDERATION of the chemistry of the crops that engage attention in this country will afford an explanation of one great difference between farming and gardening. And this difference should be kept in mind by all classes of cultivators as the basis of operations in tillage, cropping, and the order and character of rotations. The first thing to discover in the cropping of a farm is the kind of vegetation for which the land is best adapted to insure, in a run of seasons, fairly profitable results. If the soil is unfit for cereals, then it is sheer folly to sow any more corn than may be needful for convenience, as, for example, to supply straw for thatching and litter, and oats for horses, to save cost of carriage, &c. On large farms that are far removed from markets it is often necessary to risk a few crops that the land is ill fitted for, in order to satisfy the requirements of the homestead, and to save the outlay of money and the inconvenience of hauling from distant markets. But everywhere the cropping must be adapted to the soil and the climate as nearly as possible, both to simplify operations and enlarge to the utmost the chances of success. In the cropping of a garden this plain procedure cannot be followed. We are compelled certainly to consider what the soil and climate will especially favour amongst garden crops, but, notwithstanding this, the gardener must grow whatever the household requires. He may have to grow Peas on a hot shallow sand; and Potatoes and Carrots on a cold clay; and Asparagus on a shallow bed of pebbles and potsherds. To the gardener the chemistry of crops is a matter of great importance, because he cannot restrict his operations to such crops as the land is particularly adapted for, but must endeavour to render his land capable of carrying more or less of all the vegetables and fruits that find a place in the catalogue of domestic wants. That in certain cases he must fail at certain points is inevitable; nevertheless his aim will be, and must be, of a somewhat universal kind, and a clear idea of the relations of plants to the soil in which they grow will be of constant and incalculable value to him.

---

[1] Reprinted from Sutton's book on British Gardening entitled, 'The Culture of Vegetables and Flowers from Seeds and Roots.'

We are bound to say at the outset that a complete essay on the chemistry of vegetation is not our purpose. We are anxious to convey some useful information, and to kindle sufficient interest to induce those who have hitherto given but slight attention to this question to inquire further, with a view to get far beyond the point at which we shall have to quit the subject.

Plants consist of two classes of constituents—the Inorganic, which may be called the foundation; and the Organic, which may be considered the superstructure. With the former of these we are principally concerned here. A plant must derive from the soil certain proportions of silica, lime, sulphur, phosphates, alkalies, and other mineral constituents, or it cannot exist at all; but, given these, the manufacture of fibre, starch, gum, sugar, and other organic products depends on the action of light, heat, atmospheric air, and moisture, for the organic products have to be created by chemical (or vital) action within the structure, or, as we sometimes say, the tissues of the plant itself. To a very great extent the agencies that conduce to the elaboration of organic products are beyond our control (though not entirely so), whereas we can directly, and to a considerable degree, provide the plant with the minerals it more particularly requires; first, by choosing the ground for it, and next by tilling and manuring in a suitable manner. A clay soil, in which, in addition to the predominating alumina, there is a fair proportion of lime, may be regarded as the most fertile for all purposes; but we have few such in Britain, our clays being mostly of an obdurate texture, retentive of moisture, and requiring much cultivation, and containing, moreover, salts of iron in proportions and forms almost poisonous to plants. But there are profound resources in most clays, so that if it is difficult to tame them, it is also difficult to exhaust them. Hence a clay that has been well cultivated through several generations will as a rule produce a fair return for whatever crop may be put upon it. Limestone soils are usually very porous and deficient of clay, and therefore have no sustaining power. Many of our great tracts of mountain limestone are mere sheep-walks, and would be comparatively worthless except for the lime that may be obtained by burning. On the other hand, chalk, which is a more recent form of carbonate of lime, is often highly productive, more especially where, through long cultivation, it has been much broken up, and has become loamy through accumulation of humus. Between the oldest limestone and the latest chalk there are many intermediate kinds of calcareous soils, and they are mostly good, owing to their richness in phosphates, the products of the marine organisms of which these rocks in great part, and in some cases wholly, consist. For the growth of cereals these calcareous soils need a certain proportion of silica, and where they have this we see some of the finest crops of Wheat, Trifolium, Peas, and Beans in these islands. If we could mix some of our obdurate clays with our barren limestones, the two comparatively worthless staples would probably prove remarkably fertile. Although this is impossible, a consideration of the chemistry of the imaginary mixture may be useful, more especially to the gardener, who can in a small way accomplish many things that are impracticable on a great scale. Sandy soils are characterised by excess of silica, and deficiency of alumina, phosphates, and potash. Here the mechanical texture is as serious a matter as it is in the case of clay. The sand is too loose as the clay is too pasty, and it may be that we have to prevent the estate from being blown away. It is especially worthy of observation, however, that sandy soils are the most readily amenable of any to the operation of tillage. If we cannot take much out of them, we can put any amount into them, and it is always necessary to calculate where the process of enrichment is to stop. It is not less worthy of observation that sandy soils can be rendered capable of producing almost every kind of crop, save cereals and pulse, and even these can be secured where there is some basis of peat or loam or clay with the sand. The parks and gardens of Paris, Versailles, Haarlem, and Berlin, are on deep sands that drift before the wind when left exposed for any length of time with no crop upon them ; and not only do we see the finest of Potatoes and the most nutritious of herbage produced on these soils, but good Cauliflowers, Peas, Beans, Onions, fruits, and big trees full of sound timber. It would be inaccurate to say that any soil is beyond improvement, for the plough has found its way to the foot of Stonehenge, where only a hundred years ago cultivation was declared impossible, and on the granite of Dartmoor we may now see a fine grass sward where not long since the only vegetation comprised lichens and mosses. The farming and gardening at Prince Town owe their success in great part to the judicious use of sewage, and thus illustrate the immense importance of the subject before us.

Garden soils usually consist of loam of some kind, the consequence of long cultivation. Natural loams are the result of the decay and admixture of various earths, and they are mostly of a mellow texture, easily worked and highly productive. They are, as a rule, the best of all soils, and their goodness is in part due to the fact that they contain a little of everything, with no great predominance of any one particular earth. Cultivation also produces loam. On a clay land we find a top crust of clayey loam, and on a lime or chalk land a top crust of calcareous loam. Where cultivation has been long pursued the staple is broken and manures are put on, and the roots of plants assist in disintegration and decomposition. Thus there is accumulation of humus and a decomposition of the rock proceeding together, and a loam of some sort is the result. Hence the necessity of caution in respect of deep trenching, for if we bury the top soil and put in its place a crude material that has not before seen daylight, we may lose ten years in profitable cropping, because we must now begin to tame a savage soil that we have been at great pains to bring up, to cover a stratum of a good material prepared for us by the combined operations of Nature and Art during, perhaps, several centuries. But deep and good garden soils may be safely trenched and freely knocked about, because not only does the process favour the deep rooting of the plants, but it favours also that disintegration which is one of the causes of fertility. Every pebble is capable of imparting to the soil a solution—infinitesimal, perhaps, but not the less real—of silica, or lime, or potash, or phosphates, or perhaps of all these; but it must be exposed to light, air, and moisture to enable it to part with a portion of its substance, and thus it is that mechanical tillage is of the first importance in all agricultural and horticultural operations.

The principal inorganic or mineral constituents of plants are potash, soda, lime, iron, phosphorus, sulphur, chlorine, and silica. Clays and loams are generally rich in potash, sulphur, and phosphates, but deficient in soluble silica and lime. Limestone and chalk are usually rich in lime and phosphates, but deficient in humus, silica, sulphur, and alkalies. Sandy soils are rich in silica, but are generally poor in respect of phosphates and alkalies. Therefore, on a clay or loam, farmyard manure is invaluable, because it contains ingredients that all crops appreciate, and also because it is helpful in breaking up the texture of the soil. The occasional application of lime also is of importance, and not seldom this produces an almost magical effect on an old garden soil that has been heavily cropped and liberally manured. Calcareous soils are greatly benefited by a free application to them of manure from the stable and cow-byre; but as a rule it would be like carrying coals to Newcastle to dress these soils with lime. Clay may be put on with advantage; and nothing benefits a hot chalky soil more than a good dose of mud from ponds and ditches, which supplies at once humus, alumina, and silicates, and gives 'staple' to the soil, while preventing it also from 'burning.' In the manuring of sandy soils great care is requisite, because of their absorbing power. In the bulb-growing districts of Holland, manure from cowsheds is worth the enormous price of one shilling per barrow-load, for digging into loose sand for a crop of Potatoes, to be followed by bulbs. This is an exceptional case, but it illustrates the subject usefully. As sandy soils are generally deficient in phosphates and alkalies, it will on such soils be frequently found that kainit (a crude form of potash) and superphosphate of lime will conjointly produce the best results, more especially in raising Potatoes, Onions, and Carrots, which are particularly well adapted for sandy soils. Probably one of the best fertilisers is genuine farmyard manure from stall-fed cattle, for it contains phosphates, alkalies, and silicates in available forms and suitable proportions. For similar reasons Peruvian Guano is often useful on such soils. Artificial manure should be selected with a view to correct the deficiencies of the soil, and to satisfy the requirements of the crops to be grown on it.

While we have thus dealt principally with the Inorganic or mineral constituents of plants, and the way in which the deficiencies of the soil in respect of any of them may be supplied by artificial applications, we must not ignore the other class of constituents, the Organic. These are supplied almost entirely from the atmosphere itself, though, to a limited extent, the presence in the soil of humus or vegetable matter contributes also. Yet this latter, as seen in the case of land heavily dressed with farmyard or stable manure, vegetable refuse, &c., exercises important functions in other directions. Not only are mineral constituents, in forms available for assimilation, supplied, but soils so treated derive peculiar advantages as regards their mechanical state and improved physical conditions, chiefly in respect of retention of moisture, warmth, &c. Thus, sandy soils, which are very apt, through poverty in humus, to lose their moisture readily and to 'burn,' are rendered more retentive of moisture and fertilising constituents by the use of farmyard manure, &c., and have more 'staple' or substance given to them, while heavy, tenacious clays are opened out, lightened, and rendered more amenable to the influences of drainage, aëration, &c., and so become less cold and inactive.

For the present purpose the principal garden crops may be grouped in two classes, in accordance with their main characteristics and the predominance of certain of their mineral elements. The figures given below show the average percentage proportions of the several minerals in the ashes of the different plants.

In Class I. Phosphates and Potash predominate. This class consists of the less succulent plants, and includes the following: The Pea: containing, in 100 parts of the ashes,

phosphates, thirty-six; potash, forty. Bean: phosphates, thirty; potash, forty-four. Potato (tubers only): phosphates, nineteen; potash, fifty-nine; soda, two; lime, two; sulphuric acid, six. Parsnip: phosphates, eighteen; potash, thirty-six; lime, eleven; salt, five. Carrot: phosphates, twelve; potash, thirty-six; soda, thirteen; sulphuric acid, six. Jerusalem Artichoke: phosphates, sixteen; potash, sixty-five.

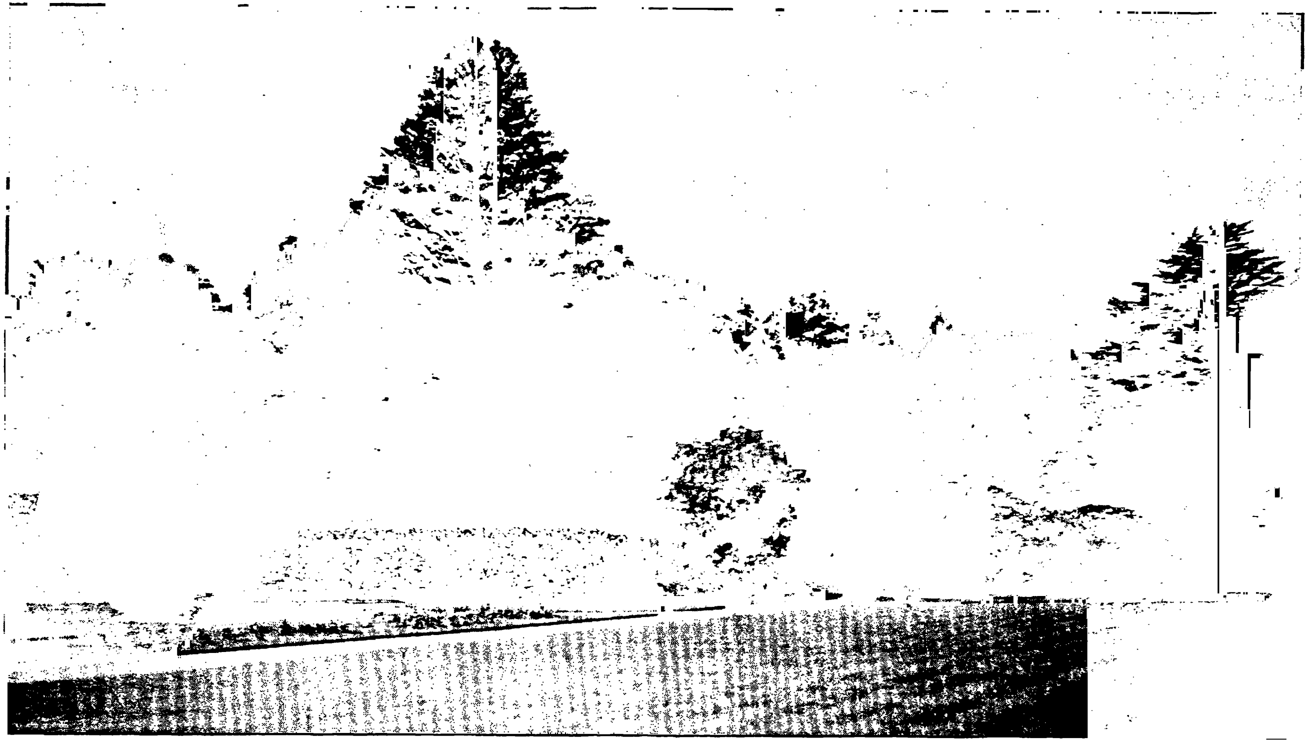
In Class II. Sulphur, Lime, and Soda Salts are prominent. This class consists of the more succulent plants, and includes the following: Cabbage: containing, in 100 parts of the ashes, phosphates, sixteen; potash, forty-eight; soda, four; lime, fifteen; sulphuric acid, eight. Turnip: phosphates, thirteen; potash, thirty-nine; soda, five; lime, ten; sulphuric acid, fourteen. Beet: phosphates, fourteen; potash, forty-nine; soda, nineteen; lime, six; sulphuric acid, five.

As a matter of course, Lentils and other kinds of Pulse agree more or less with Peas and Beans in the predominance of phosphates and potash. So, again, all the Brassicas, whether Kales, Cauliflower, or whatever else, agree nearly with the Cabbage in the prominent presence of lime and sulphur; ingredients which fully account for the offensive odour of these vegetables when in a state of decay. Fruits as a rule are highly charged with alkalies, and are rarely deficient in phosphates; moreover, stone-fruits require lime, for they have to make bone as well as flesh when they produce a crop. As regards the alkalies, plants appear capable of substituting soda for potash under some circumstances, but it would not be prudent for the cultivator to assume that the cheaper alkali might take the place of the more costly one as a mineral agent, for Nature is stern and constant in her ways, and it can hardly be supposed that a plant in which potash normally predominates can attain to perfection in a soil deficient in potash, however well supplied it may be with soda. The cheaper alkali in combination as salt (chloride of sodium) may, however, be usually employed in aid of quick-growing green crops; and more or less with tap-roots and Brassicas. Salt, too, is very useful in a dry season by reason of its power of attracting and retaining moisture. As regards Potatoes, it seems worthy of observation that they contain but a trace of silica, and yet they generally thrive on sand, and in many instances crops grown on sand are free from disease and of high quality, although the weight may not be great. The mechanical texture of the soil has much to do with this; and when that is aided by a supply of potash and phosphates, whether from farmyard manure or artificials, sandy soils become highly productive of Potatoes of the very finest quality. On the other hand, Potatoes also grow well on limestone and chalk, and yet there is but little lime in them. Here, again, mechanical texture explains the case in part, and it is further explained by the sufficiency of potash and phosphates, as also of magnesia, which enters in a special manner into the mineral constitution of this root.

Thus far we have not even mentioned nitrogen, or its common form of salts of ammonia; nor have we mentioned carbon, or its very familiar form of carbonic acid. These are important elements of plant growth; and they account for the efficacy of manures derived directly from the animal kingdom, as, for example, the droppings of animals, including guano, which consisted originally of the droppings of sea-birds. Some of the nitrogen in these substances, however, is of an evanescent character, and rapidly flies away in the form of carbonate of ammonia; hence, a heap of farmyard manure, left for several years, loses much of its value as manure, and guano should be kept in bulk as long as possible, and protected from the atmosphere, or its ammonia will largely disappear. One difficulty experienced by chemists and others in preparing artificial manures is that of ‘fixing’ the needful ammonia, so that it may be kept from being dissipated in the atmosphere, and at the same time be always in a state in which it can be appropriated by the plant. We cannot supply plants with nitrogen directly, but in all good manures there is a certain proportion of it in combination, and in many instances the percentage of nitrogen is made the test of the value of a manure.

The importance of humus—the black earthy substance resulting from the decay of vegetation—in a soil is that it contains in an assimilable form many of the ingredients essential to plant life. Humus when it decomposes gives off carbonic acid, which breaks up the mineral substances in the soil and renders them available as plant food. When vegetable refuse is burned, the nitrogen—one of the costliest constituents—is dissipated and lost. But by burying the refuse the soil gets back a proportion of the organic nitrogen it surrendered and something over in the way of soluble phosphatic and potassic salts; and as this organic nitrogen assumes ultimately the form of nitric acid, it can be assimilated by the growing plant, to the great benefit of whatever crop may occupy the ground.

The practical conclusion is, that in the treatment of the soil a skilful gardener will endeavour to promote its fertility by affording the natural influences of rain, frost, and sun full opportunity of liberating the constituents that are locked up in the staple; by restoring in the form of refuse as much as possible of what the soil has parted with in vegetation; and by the addition of such fertilising agents as are adapted to rectify the natural deficiencies of the soil. Thus, instead of following a process of exhaustion, the resources of the garden may be annually augmented



COPYRIGHT S. & S.

FLOWERS FROM SEEDS

IN

TROPICAL, SEMI-TROPICAL, AND TEMPERATE CLIMATES

ABRONIA UMBELLATA

AN attractive little creeping plant, allied to the beautiful Marvel of Peru. The flowers somewhat resemble those of the Verbena, but generally they are smaller, of a rosy tint, and decidedly sweet-scented. Abronia is a native of California and grows freely on sandy soils. It thrives in tropical countries at an altitude of 3,000 feet, or more, above sea level; seed may be sown from August until January. For Australia and South Africa the sowing period is January and February, but in districts subject to frost the protection of a frame will be necessary. September and October are the months for sowing in Egypt and other countries on the southern shore of the Mediterranean.

ABUTILON

THE hybrid varieties of Abutilon are very charming plants, easily managed in sub-tropical gardens, and also in climates where protection is necessary during the winter season. In habit of growth the plants are extremely graceful, and there is a considerable diversity in the pure tones of colour.

As to soil, the rich cultivated loam, which meets the requirements of so many garden flowers, is entirely suitable for the Abutilon ; but it is essential that there should be perfectly free drainage. In pots this can be secured by the admixture of sharp sand or fine clean grit of any kind. This is all the more important as the addition of thoroughly decayed manure will be necessary, and the compost must be well firmed into the pots.

COPYRIGHT S. & S.

Near the sea level in tropical regions, the simplest plan is to treat the Abutilon as an annual by sowing seed from September to November. The seedlings bloom from January to March, and when they cease to be attractive it is wise to destroy them. But at an altitude of 2,000 to 3,000 feet, with a yearly rainfall not exceeding fifty inches, the plant is most successful in the second year, flowering continuously for several months ; in the third season it is not so satisfactory. Where winter and summer are more sharply divided the Abutilon does not experience so prolonged and exhausting a season, and it may live for many years. Should it be allowed to stand, the branches must be cut back half their length.

Seed can be thinly sown in six-inch pots ; when the plants attain a height of six inches they must be transferred separately to the nine-inch size, or be planted in groups of three in a border on the shady side of a house or tree. The object is to afford them some protection from the fierce rays of the sun during the hottest hours of the day. In shifting them it will be observed that each one has a strong tap-root which should be neither broken nor bent upwards. By the following February the plants will be fairly developed. The pots must be kept in the shade, although this may necessitate daily removal. Perhaps in June it may be desirable to prune off some of the branches in the event of their appearing to be at all weak.

Both in Egypt and South Africa seed of this shrub may be sown at any time, and it will bloom freely if regularly supplied with water and protected from hot winds. The Abutilon does well in Australia, where it appears to great advantage in shrubberies.

ACACIA

Acacia lophantha is allied to the Mimosa, and it makes a handsome greenhouse shrub; foliage finely cut; flowers yellow. The plant thrives in warm and temperate climates. Seed can be sown in pots at any convenient season. In countries subject to a cold spring, the sowing may be in pans, kept in a moderate heat; when large enough the seedlings should be transferred to separate pots and be shifted on until they are in a size of about seven or eight inches.

A. dealbata is a charming species, popularly known as Mimosa, and attains a height of six feet; the large fern-like leaves have a silvery sheen; flowers clear yellow, and sweetly scented. Australia is the home of this plant, but it thrives in South Africa, on the mountains of India and Ceylon, and in all warm countries. In temperate latitudes it is necessary to sow in heat and pot off when ready.

ACHIMENES

A FREE-BLOOMING and beautiful herbaceous perennial, obtained from tropical America. The great diversity of colours, and the present size of cultivated flowers, are the result of long-continued efforts by a number of skilled horticulturists. Formerly the scaly rhizomes were exported, but this practice has long been abandoned in favour of seed, from which a large number of plants can be raised for a very trifling outlay.

COPYRIGHT S. & S.

As Achimenes are tropical plants, it will be inferred that in warm countries there are no cultural difficulties. The point of chief importance is the constant maintenance of moisture. Seed may be thinly sown during August and September in a mixture of leaf mould, loam, and sand. Where sharp sand is scarce an efficient substitute will be found in finely crushed bricks. The seedlings on attaining a height of two inches should be pricked off into pans or pots, spaced not less than two inches apart; or if convenient they may be transferred separately to pots and afterwards be shifted into a larger size for flowering. Achimenes answer admirably as decorative subjects for hanging in verandahs.

For Australia and South Africa the sowing period is August and September; the shelter of a greenhouse or conservatory may be necessary to exclude hot dry winds.

In Egypt seed can be sown in March and April, and the plants thrive under any arrangement that will insure a moist atmosphere in summer.

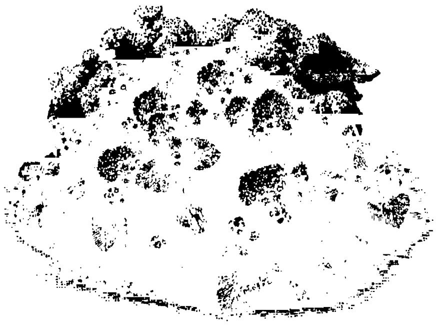
ACROCLINIUM

SEMI-DOUBLE and single everlasting hardy annuals, first introduced into England from Australia. The semi-double variety is rose-coloured; but the single affords two colours, rose and white, of which seed is saved separately. The flowers are effective in borders during the blooming season, and they are extensively grown for winter decorations. For the latter purpose they should be cut before they are fully expanded; if stored in a safe position free from dust they will remain bright and fresh in appearance for many months. In warm and temperate climates Acrocliniums grow freely in ordinary garden soil.

AGERATUM

AN effective bedding annual, remaining in bloom for the whole of the summer. Two dwarf varieties, blue and white, have a distinct value for edgings and borders, where the compact heads of bloom produce striking groups or bands of colour, especially when two or three rows are closely planted. The taller blue and white varieties are in considerable demand for bouquets; they are more suitable for cutting than the dwarfs because of their longer stems.

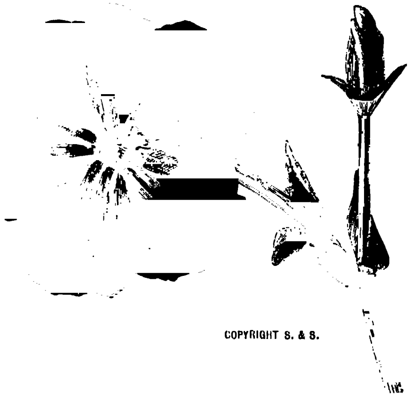
Ageratum is of the easiest possible culture in the tropics, but every season it is necessary to obtain seed saved in temperate climates, or the plants degenerate in character until they resemble a weed which is widely distributed in hot climates.



COPYRIGHT S. & S.

AGROSTEMMA

THE flowers of the beautiful *Agrostemma coronaria* were formerly woven into garlands, hence the name. There is considerable diversity in colour, but the two which are especially worthy of culture are the dark crimson, having a beautiful foil in the broad silvery foliage, and the white variety. Both are easily grown in dry tropical climates by sowing seed from August to November. In the southern temperate zone the usual sowing period is September.



COPYRIGHT S. & S.

The plant is related to the Sweet William, and is commonly known as Rose Campion.

ALONSOA

AN exceedingly pretty annual, allied to the Musk and Snapdragon. Three or four varieties are popular, and they all produce pink or scarlet flowers. The plants vary in height from about 12 to 18 inches. They need a moist soil, and are most successful in a temperate climate. Seed should be sown on a well-prepared bed of rich loam. When the seedlings are large enough to handle, prick them out four inches apart; later on plant separately, giving them a thick mulching of old manure and frequent attention with water when necessary.

In Australia, New Zealand, South Africa, and temperate South America, seed is sown in January. The young plants are kept through the winter under shelter and are planted out in September or October.

August to November are the sowing months for India, Burma, Ceylon, Central Africa, and the West Indies; the earlier date for altitudes from 2,000 to 4,000 feet, the later date for the sea level.

For Egypt and other countries immediately south of the Mediterranean, July and August are favourable months for sowing. By January or February the plants should be well established, and may then be planted in flowering quarters.

ALSTRŒMERIA

IN European countries it is usual for amateurs to commence the culture of Alstrœmerias by purchasing mature tubers. But it entails a considerable outlay to import them, and this can be safely done only during the resting season. Seed is inexpensive, and can be transmitted through the post at any period of the year. It has therefore become the custom in India and the Colonies to raise the required number of plants from seed, with most satisfactory results.

Although Chili and Peru are the home of the Alstrœmeria, the plant is almost hardy in temperate countries. It belongs to the same family as the Amaryllis, and produces very handsome flowers of rich and varied colours. The roots may be freely handled when at rest, but they should not be disturbed while growing.

Seed can be thinly sown in the open border, with slight shade where the climate is hot, and with the advantage of a seed protector where the soil remains cold in spring. It may even be necessary to make a small seed-bed of fermenting manure, covered with 4 or 6 inches of fine soil ; with the additional aid of a seed protector success will be fairly assured.

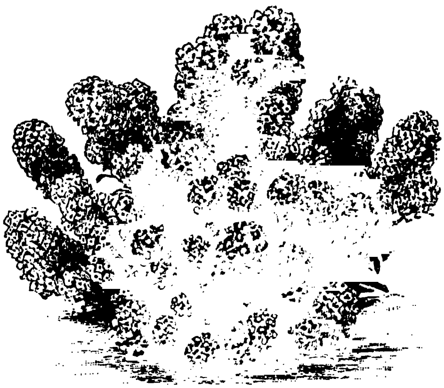
During the growing season frequent watering must not be neglected. If in autumn the roots are crowded, they had better be lifted and replanted 4 inches apart. This should not be done unless it appears to be an actual necessity, as the bulbs thrive best undisturbed. It is an advantage to cover the bed with a thick layer of light manure for the winter.

ALYSSUM

THREE varieties are extensively grown in European gardens. *A. saxatile compactum* is a valuable perennial, admirably adapted for spring bedding or rockwork. The plant only attains a height of about six inches, and is densely crowded with bright yellow flowers. In temperate climates it is perfectly hardy, and it also does well in the tropics at an altitude of from 5,000 to 7,000 feet, with protection from direct sunshine during the middle of the day. Seed may be sown at the height of summer; the plants should be pricked out in nursery beds where they may develop for transferring to flowering quarters in spring.

Sweet Alyssum is a free blooming annual, suitable for beds and edgings; flowers white. By preventing the plants from seeding they will bloom a second time. Height nine inches.

A. minimum is a beautiful miniature Alyssum, growing close to the ground, profusely covered with small white flowers. This also is a hardy annual, especially suited for edgings, rockwork, and nooks that need carpeting with a dwarf plant.


COPYRIGHT S. & S.

AMARANTHUS

SOME authorities spell the name Amarantus, and as a description of the unfading character of the foliage, this is strictly correct. The splendid tints of crimson, scarlet, pink, yellow, and bronze-green in the foliage scarcely need flowers to enhance the ornamental effect of the plants.

All the varieties grow freely in temperate and tropical countries, and in masses they are conspicuous for their beauty as bedding subjects. The simplest and most effective system is to sow seed where the plants are intended to stand,

and thin to the proper distance, beginning the operation while the seedlings are quite young. This insures robust growth from the earliest stage. One favourite variety, *A. caudatus*, is commonly known as Love-lies-bleeding. The stems rise to a height of from 3 to 6 feet, according to the soil and season, and the graceful pendulous flowers may attain from 2 to 4 feet in length. The soil should be specially tilled, and to insure handsome specimens clear liquid manure can occasionally be administered instead of water. The surface soil must also be stirred at short intervals to maintain healthy growth. Grown by the side of a pillar and lightly attached to it, a fine specimen of Love-lies-bleeding is very attractive.

COPYRIGHT S. & S.

LOVE-LIES-BLEEDING

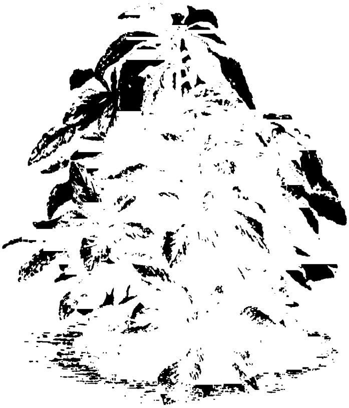
A. tricolor splendens is an exceedingly beautiful ornament in borders, either alone or in groups. The broad rich glowing crimson foliage is marked with yellow and bronze-green.

A. melancholicus ruber is extensively grown for its rich bright red foliage. As the height is usually about one foot, this variety can be used in harmony with, or as contrast to, a large number of other bedding plants.

A. salicifolius.—The long undulating foliage of this charming plant is highly ornamental when cultivated in deep rich soil, and makes an elegant pot plant. But few seeds should be sown in each pot, gradually thinning until only the strongest remains. Transfer those intended for borders when about four inches high, choosing an open sunny position. This must be done with extreme care to avoid breaking the root. If set in a groundwork of Indian Pinks, or other dwarf pale green plants, the effect will be greatly enhanced.

In India, Burma, Ceylon, Central Africa, and the West Indies, seed should be sown in June where the rainfall is scanty, and in August or September where the average is greater.

Sowings are made in September and October in Australia, the countries immediately south of the Mediterranean, and in tropical and temperate South America. In temperate regions the protection of a frame will be requisite during cool weather.



AMARANTHUS MELANCHOLICUS

AMARYLLIS

This popular bulbous flower excites keen enthusiasm, especially among amateurs of refined taste. An experienced Anglo-Indian has expressed the conviction that ere long the Amaryllis will be as extensively grown in warm countries as are Hyacinths, Daffodils, and Tulips in the temperate zone. The splendid form, and the range of magnificent colours, unquestionably merit all the praise lavished on the flower by ancient poets and modern gardeners.

Since European experts have taken the plant in hand, seed has been saved annually from the finest varieties, with such excellent results that first-class strains are valued in those countries which are the home of the Amaryllis, and amateurs are especially delighted that seed worth growing is now at their command.

At Lucknow and Poona the plant grows freely in the open ground. In Bombay it answers well in pots, but the excessive moisture of the rainy season is against it in borders. Bulbs are, however, frequently placed in bowls filled with sand which is kept damp, and under this treatment they flower freely. When the blooming season comes to an end, the bulbs are allowed to finish growth in the garden in readiness for house adornment in the following season.

COPYRIGHT S. & S.

In Australia the plant answers well in the open border if kept dry during the winter. In South Africa, *A. Belladonna* is a native. This and other species have been used in producing the hybrid varieties now cultivated in gardens, and it is needless to state that in Africa the best method of treating it is perfectly understood.

The climate which suits Amaryllis is generally warm, without a protracted period of rain. During the resting season it is an advantage to the bulbs that the soil should be somewhat dry.

In all tropical countries seed may be sown thinly in August and September, on a raised bed of fine rich soil, which must be watered daily in dry weather. The germination of the most reliable seed is generally capricious. Part of the sowing may spring up quickly, while the remainder, although saved at the same time, may show no sign of life for several weeks. The seedlings should be left in the bed during the first season, and in December, when the foliage has died, the bed must be covered with a thick coating of leaves as protection from excessive sun heat. Meanwhile, other beds of rich loamy soil which can be irrigated should be prepared to receive the small bulbs. Just before they start growth, probably in June, they are to be lifted carefully and planted in rows one foot apart, allowing six inches between the bulbs in the lines. Regular supplies of water will be necessary, and the frequent substitution of liquid manure is an advantage. During the following season these bulbs will flower from March to July, and if properly treated they can be brought forward for several years in succession.

Although it is more convenient to transplant the bulbs when about to commence growth, they suffer no injury at a later period provided they are not roughly handled.

The Amaryllis naturally flowers in spring, but in some tropical countries it is then so hot that the garden has few visitors. In such cases it is advisable to lift the bulbs early in February, store them in a dry place, and replant in June ; or part may be left in the garden, and before the flowers open they can be cut and taken indoors. By removing a small portion from the base of the stem every morning, and constantly changing the water, the blooms will retain their attractiveness for nearly a fortnight.

In Egypt the Amaryllis attains the height of perfection.

It blooms early if permitted to do so, and may be sent to rest during the hot summer months, simply by withholding water. Seed may be sown in the Egyptian delta at any period of the year, but November to January is the most favourable season. The nursery should be formed of walls of sun-dried bricks, seven feet in height. These, if arranged in narrow lanes, can be covered at night during winter by mats stretched on light spars, and by thin shading material during summer days.

The Amaryllis thrives in all countries where the shade temperature ranges from 40° to 80° F. (5° to 27° C.), and seed may be sown with confidence throughout the first half of the growing season. Rich loamy soil and leaf-mould suit the plant, and in every case perfect drainage is essential. Each bulb should be so planted as to leave the neck above the soil; only the larger swollen part need be covered.

AMMOBIUM

THE name literally implies that the plant lives on sand. This indicates the character of the soil in which it especially thrives, and the kind of treatment it should receive. Experience has proved that Ammobium also does well in any ordinary garden loam. The plant is really biennial, and is sometimes grown as such in temperate climates, but in warm countries the most simple and convenient course is to treat it as an annual. The flowers are everlasting.

ANAGALLIS GRANDIFLORA

A VERY beautiful annual, half hardy in temperate climates, but in warmer countries it can be freely grown by sowing seed in the open borders at the commencement of each season. The variety known as *A. Phillipsi* produces blue flowers, while those of *A. Garibaldi* are scarlet. The plants manifest a marked preference for damp soils, and thrive by the side of streams. In the Deccan the roots may be seen in water.

ANCHUSA

THERE are numerous varieties of this member of the Borage-wort family, but the perennial *A. italica*, which has hitherto been cultivated in gardens, is rather tall-growing, attaining a height of 4 feet; the Dwarf Blue, only half the height, is therefore generally preferred. Both produce deep blue flowers, and are deservedly valued as early blooming decorative border subjects.

In hot climates *A. italica* is generally grown successfully as an annual. Where the altitude exceeds 2,000 feet, seed is sown at the beginning of the rainy season.

In temperate countries the sowing period is June and July; in autumn the seedlings are transferred once or twice to nursery beds, and during the following spring they are planted in flowering quarters. A sunny border suits them admirably.

ANEMONE

FOR all but the bleakest districts within the temperate zone, the Anemone or Wind Flower is one of the most delightful garden ornaments. It makes an attractive display in beds and borders, and is very largely grown for the adornment of vases in the house. The flower is comparatively useless for the hot plains of the tropics, but when weary toilers retire to the hills for rest and recreation, they may grow beautiful

Anemones from seed with ease and certainty. The plant is a perennial, but it is less troublesome as an annual, and expense is saved by sowing seed every year. After the blooming season has passed, it is wise to consign the plants to the rubbish heap for the next garden fire.

Anemones take kindly to soils which are somewhat stiff, but they can be grown on any ordinary garden border. The seed should be gently rubbed with sand or fine friable soil, and both seed and soil may be thinly spread over the seed-bed, which, as a finish, should be lightly beaten with the back of a spade. The situation must be shaded from direct sunshine, and frequent watering will be necessary. In India, the common porous jars are often employed for the purpose along the top of sloping ground. These allow the water to trickle slowly over the surface of the bed and keep it in the state of moisture most favourable to Anemones.

For South Africa, April to July are the sowing months; early autumn suits Australia; and autumn, winter, and spring the Argentine Republic.

ANTIRRHINUM

THE Snapdragon is a very old garden favourite. As with a number of other popular flowers, several hybrid varieties have been obtained by experts which entirely eclipse in beauty, variety of superb colouring, and the free production of flowers, the old-fashioned plants that satisfied former generations of gardeners. Three distinct modern strains are now in vogue, dwarf, intermediate, and tall, and all are rich in exquisite tints of crimson, brown, and yellow. They can be grown in groups or as single specimens in mixed borders, and in beds they produce dense masses of colour.

The usual season for sowing Antirrhinum seed in the tropics varies from August to November, according to the altitude. At an elevation of 2,000 to 4,000 feet, the former date is suitable, and the latter near sea level. In the Himalaya and Nilgiri Hills sowings are made in March and April. August and September suit South Africa, New Zealand, South Australia, temperate South America, and Egypt. In some cool districts the best months are March and April. The sowing period for the Argentine Republic extends from January to August.

COPYRIGHT S. & S.

AQUILEGIA

ONE of the most graceful perennial herbaceous plants grown in garden borders, commonly known as Columbine. The delicate green foliage is exceedingly beautiful and is often used for the decoration of vases with its own or other flowers. In recent years many charming hybrids have been introduced, some of them having long spurs which enhance their ornamental appearance. Either as single specimens or in groups they are quite at home in mixed borders, or among shrubs by the sides of carriage drives. The colours include pure white, crimson, gold, and various shades of tender blue and yellow.

In the tropics Aquilegias thrive at an altitude of 5,000 feet if shaded from the afternoon sun. Plants from seed sown early in the season will probably flower later in the year. Those which do not will bloom in the following season. Whether slight protection is advisable to carry them safely through the coldest months depends on the district, and the point can best be decided on the spot.

In northern latitudes seed is sown under shelter, where necessary, in early spring, and in the open ground towards midsummer. The seedlings are pricked off once, and then transplanted to flowering positions.

COPYRIGHT S. & S.

ARABIS ALPINA

For spring bedding and rockeries this is one of the most familiar plants in British gardens. The pure white flowers make an effective contrast with those of *Alyssum saxatile compactum*, and as the two agree in height, about 6 inches, they are frequently associated.

Like many other hardy subjects, *A. alpina* endures the rigours of temperate winters with impunity, and is of especial value in countries and districts having distinct seasons of cold and warm weather. The plant is a hardy perennial, easily raised in the northern hemisphere by sowing seed in May, June, or July. When ready for transfer, the seedlings should be pricked off in rows far enough apart to insure free growth. After the beds and borders are cleared of summer occupants, the plants should be put into final positions for spring flowering. For the southern hemisphere a similar procedure is necessary, but the months for sowing will be September, October, or November.

ARMERIA

THIS hardy perennial, known as the Giant Thrift, produces rose-coloured flowers twice or thrice as large as those of the common variety. It is a most useful edging plant, and as the blossoms are on long stems they are of especial service for vase decoration when cut, because they retain their brilliant appearance for a long period in water. The plant is adapted for temperate climates, and answers well near the sea-shore. Sow in pans in spring for flowering in the same year, or in July for blooming in the following season.

ASPARAGUS

TOWARDS the end of the eighteenth, and at intervals during the nineteenth century, several species of Asparagus were imported into Europe, chiefly from Africa, for the beauty of their foliage alone. In temperate climates these varieties are cultivated as greenhouse plants on account of their ornamental character, and they are also largely grown for cutting. Four of them are available from seed, all worthy of attention in the gardens of warm countries.

A. decumbens produces long tremulous dark green finely cut foliage; the drooping habit is of especial value in hanging baskets and bouquets.

A. plumosus is an elegant climber, with delicate fern-like foliage, which has a most attractive appearance when attached to the columns of a verandah.

A. plumosus nanus is a dwarf variety of the preceding, well suited for pot culture or for use in table decoration.

A. Sprengeri also makes a charming display in hanging baskets and mat conservatories. It forms an admirable contrast with *A. plumosus.*

All these are easily grown in the tropics where the rainfall is not excessive. Seed is evenly sown in small pots, which are then plunged in sand. The plants are thinned to three in each pot, and these when a few inches high are transferred to larger pots with the least possible disturbance of the roots.

In countries where snow prevails during winter it is useless to sow Asparagus until danger from frost is past unless artificial heat is available.

ASPERULA

TWO varieties are popular in European gardens, and both can be grown from seed in temperate countries. *A. azurea setosa* is an annual, producing clusters of small blue flowers in great profusion for a prolonged period. As the blossoms are sweet-scented they are much in request for bouquets. *A. odorata* is perennial and a native of Britain, where it is commonly known as Sweet Woodruff. The flowers are pure white and sweet-scented. Seed should be sown in open borders in spring, and receive the usual culture of plants that are perfectly hardy.

ASTER

SINCE the Aster was introduced from China in 1731, much has been done by European horticulturists to diversify the colour and vary the form of this valuable garden annual. Instead of the original dull purple, there are now flowers of snowy whiteness, numerous shades of pink, red, crimson, and many tints of blue, gradually deepening to sumptuous tones of purple; while several varieties include flowers which combine two contrasting colours. In form there has also been a development of distinct types, such as the Pæony-flowered with incurved petals, the Victoria class, and the splendid Chrysanthemum-flowered strains, the latest of which, Comet, bears a close resemblance to a well-grown Japanese Chrysanthemum. The height ranges between about eight inches for the dwarfs, and two feet for the tall-growing Asters. Thus an extensive choice is open to the cultivator both for bedding and border effects. It is only just to state that those who

COPYRIGHT S. & S.

are accustomed to make comparative trials of Asters offer neither an indifferent variety nor a superfluous colour.

Asters need a very rich friable soil for the seed-pans, and when sown on borders it is scarcely possible to make the bed too good for them. The ground in which they are to flower must be carefully prepared in advance, and should be generously manured. On poor soil the plants are stunted, the flowers come small, and fail in brilliancy of colour. A deep rich loam suits them admirably, and should the soil be somewhat retentive, so much the better, provided the staple has been finely broken up and freely manured. Under favourable conditions the plants become robust, and the flowers retain their full beauty for a long period.

In temperate climates seeds are sown in pots or on prepared beds in early spring under the shelter of glass. Later in the season, beds are made in the open, on heaps of manure covered with leaf-mould or good sifted loam, protected by lights and mats when necessary. On these beds seeds are sown in lines six inches apart and thinned to three or four inches in the rows ; or the seedlings are pricked off in preparation for planting out. When transferring Asters it is necessary to bear in mind that a check is injurious. Each plant should be lifted carefully, with the soil in which the roots ramify. This suggestion applies to Asters in all countries, whatever the temperature may be. In the United Kingdom it is a common practice as the season advances

COPYRIGHT S. & S.

ASTER, GIANT FRENCH

to sow where the plants are to flower, and thin to the proper distances. The spacing differs according to height, and may vary between six and fifteen inches. Open-air sowings often produce the finest plants of the year, for the simple reason that growth has not at any stage been arrested.

COPYRIGHT S. & S.

ASTER, COMET

Throughout the southern hemisphere from August to October is the usual sowing period, and the same months are suitable for Egypt. In the Argentine Republic seed is got in from April to September.

COPYRIGHT S. & S.

ASTER, READING BEAUTY

The sowing season in India, Burma, Ceylon, the West Indies, and Central Africa is August to November; the earlier date for an altitude of about 1,000 feet, the later date near sea level. At a height of 5,000 feet or more, March and April are suitable months, and protection may be necessary from frosts or cold winds.

A garden frame is a great aid in cold wet districts. In its absence a large sheet of glass supported on four pegs a few inches above ground, held by a simple spring wire attachment, is made to answer the purpose. The glass is slightly inclined towards the sun, and with a little management it assists the germination of the seed and the development of the young plants. The cost is merely nominal, and the effect is enhanced by covering the glass with a dry mat at night.

In tropical climates the bed for Asters must be shaded with cocoa-nut-fibre matting, tightly stretched and arranged on the sunny side at an angle of 45°, with its lower edge about two feet from the ground. The soil should be soaked twelve hours before sowing. Shallow furrows are made by pressing a rake handle into the soil at regular intervals of six inches. Seed is thinly sown in the furrows, and lightly covered with a layer of fine dry sand or earth.

COPYRIGHT S. & S.

After transplanting, a thorough watering must be given at once, followed with light spraying for a few days until the plants are established. Gradually the intervals of watering may be lengthened, but the quantity given on each occasion must be proportionately increased. Especially is it needful to keep the plants moist while in rapid growth. Watering is often entrusted to careless hands with fatal results. As the constant application of water hardens the surface to the detriment of the plants, the bed should be stirred with the hoe, and if covered with old decayed manure it will be a further advantage. But on no account must fresh manure be used, or the plants will be scorched.

The Hindu gardener's notion ot growing Asters is to starve three plants in a shallow pot ten inches across, while a blaze of colour may be seen from the same variety in the public garden near his door. None the less is it true that Asters make very admirable pot plants ; but instead of growing them in the pots, a finer display can always be obtained by lifting plants from the border and potting them with the earth surrounding the roots. The operation is really very simple, although it needs a dexterous hand. Water must be given at once, and the pots need to be carefully shaded.

The illustration on page 153 has been reduced from the photograph of a dwarf bedding Aster, planted in three colours, red, white, and blue. The bed was edged with *Cerastium Biebersteinii.*

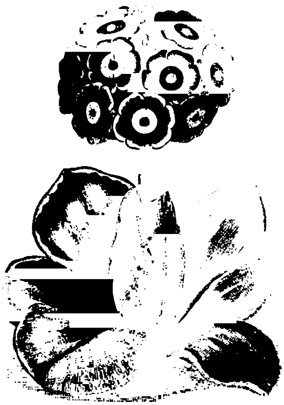
AUBRIETIA

THE species of Aubrietia which obtain favour in gardens are perennial trailers, having a dense habit of marked value for rockeries or as dwarf edging plants. They bloom early in spring, and the dark flowers make a striking contrast with the pure white of *Arabis alpina*, which flowers at the same time. As a native of Italy, it will be understood that the Aubrietia is suitable for warm and temperate climates. Plants are easily raised from seed sown about midsummer, and the seedlings only need pricking off into beds, and planting in autumn where they are wanted in the following spring.

AURICULA

THE *Primula Auricula* of the Swiss Alps is no doubt one of the parents of this remarkably beautiful flower. Like most Alpine plants, which are covered with a blanket of snow for part of the year, the Auricula is sensitive to the changes of a lowland atmosphere, and it suffers from the impurities which are incidental to the proximity of large towns, where growers chiefly reside. On tropical plains near the sea level it is useless to waste time in the attempt to grow this flower, but on the hills it will make a full return for the little trouble entailed in raising plants from seed.

Two distinct types of Auricula are cultivated—the Show and the Alpine. The former is divided into four classes, which are judged by so rigorous an exhibition standard that flowers perfect in all points are seldom staged. This is one of the instances where severe rules beget enthusiasm, and as a result the Auricula shares with the Rose and the Chrysanthemum the distinction of being worthy of a separate exhibition, promoted by a Society bearing its name. It might perhaps be inferred that the culture of Auriculas is confined to professional experts. On the contrary, amateurs are most ardent growers, and the friendly rivalry between them is keenly enjoyed. Although the flowers from seedlings may seldom conform to the artificial demands of a show standard, they possess a singular beauty which wins the admiration of those outside the charmed circle of the initiated.


COPYRIGHT S. & S.

There are no cultural difficulties. One quality is indispensable, and that is patience. The germination of the seed is not only slow, but extremely capricious. Of two seeds from a single pod, one may germinate after a few weeks, the other may be months before it manifests vitality. The plant is also slow in development. Not until the third season can a reliable opinion be formed as to the merits of any seedling.

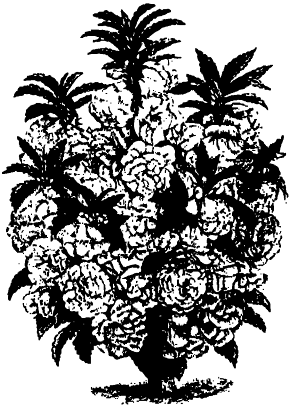
One word of advice which is worthy of attention may be offered concerning all seeds, especially of those needing much time to show their real value. First-class strains cannot be low in price. They are the result of knowledge, skill, and years of earnest labour. But they save the loss of time, disappointment, and discouragement incidental to the sowing of common strains.

In all countries Auricula seed may be sown at the opening of the growing season, in well-drained pots, filled with a mixture of turfy loam, leaf-mould, decayed cow-manure, and sharp sand or finely broken charcoal. Firm the soil into the pots and press the seeds gently into the surface at regular intervals; cover with a thin coating of fine soil, and await results with patience. Instead of watering in the ordinary way, maintain moisture by immersing the pots up to the rim for half an hour. As the plants appear and become large enough to lift, transfer to small pots without disturbing the soil; other seedlings may rise later on. The pots must never go dry, but as winter approaches less water will be necessary than in summer. Artificial heat is needless. When large enough put the plants into a north border if possible, and after maturity they will show their lovely flowers every spring. Purely as a question of beauty, the Show varieties must have precedence. For usefulness, however, the Alpine and border classes will continue to be held in high favour.

BALSAM

THE Balsam, known botanically as *Impatiens Balsamina*, is a native of India, where it may sometimes be seen growing on the top of a wall or the ledge of a quarry. It is therefore suitable for culture in all tropical and semi-tropical countries. For the garden it is of primary importance to insure a good strain. A really handsome flower is a perfectly formed rosette, quite as double as a Camellia, although the petals are not arranged in precisely the same way. The flowers should be densely crowded, not only on the main stem, but on every separate branch of the plant. The strains which have been brought to the highest state of excellence unfortunately yield very little seed, whereas flowers of less value seed freely.

Balsams are exceedingly succulent, and to grow fine specimens very rich soil is imperative. A suitable mixture may be composed of a small proportion of good loam, plenty of leaf-mould, and a considerable addition of old cow-manure. This compost is suitable for both pots and beds, but seed can be sown in a bed of pure leaf-mould. At a height of three to four inches the seedlings are either potted separately in six-inch pots, or planted out in clusters, or in lines eighteen inches apart, allowing a space of twelve to fifteen inches in the rows. When transferring the plants it is advisable to set each one an inch or two deeper than the first growth; the stems then throw out fresh roots near the surface, and these roots promote robust development. The conditions which favour the production of stately plants, covered with large flowers, are regular watering, abundance of light, free ventilation, and the absence of crowding.


COPYRIGHT S & S.

In tropical countries of the northern hemisphere seed may be sown fortnightly from June until October; in the southern hemisphere from September to January.

January to March suits Egypt and North Africa generally, but early sowings must have the aid of a garden frame and matting at night. April and May are the sowing months for Canada ; September to December for Australia, New Zealand, South Africa, and the temperate climates of South America ; August to November for the River Plate district.

In all countries having a winter more or less severe, the early sowings of Balsam seed must be under the protection of glass, and the subsequent culture will be that of a half-hardy annual.

BARTONIA AUREA

THIS showy annual was obtained from California in 1834. It is adapted for warm and temperate climates, and thrives under ordinary border cultivation. The large bright golden yellow flowers are produced in great profusion, and show conspicuously in borders or in spaces between shrubs. Seed should be sown in the opening spring, under a frame where necessary. In the United Kingdom it is usual to sow in the open ground in April. The height varies between a foot and eighteen inches, according to soil, season, and treatment.

BEGONIA, TUBEROUS-ROOTED

EARLY in the closing half of the nineteenth century a new race of Tuberous-rooted Begonia was introduced into Europe from the Andes, and experts at once perceived the immense possibilities which this plant offered. By means of cross-fertilisation and careful selection, they succeeded in developing the present magnificent strains of single and double flowers, which every year appear to increase in size, symmetry, and beauty. In their own range of colour no other subject is

COPYRIGHT S. & S.

DOUBLE TUBEROUS-ROOTED BEGONIAS

comparable with them. Both singles and doubles are peculiarly rich in shades of yellow, red, and especially in the endless tints of salmon and buff. In gorgeous tones of crimson, modern Begonias stand absolutely alone.

Those who grow the finest strains for the first time are so delighted with the purity and intensity of colouring, that a resolution is generally formed to save nearly all the tubers through the resting season for flowering again in the following year, and there is no difficulty in doing this. But those who raise a stock of plants every year find from experience that it is far less troublesome to sow seeds annually, and that nothing is lost in charming variety of colour, or in the high quality of the flowers. From seed sown at the first dawn of spring it is easy to insure a large stock of Begonias, and these, under the usual treatment of greenhouse annuals, will in about six months afford a sumptuous display of bloom. At the close of the season the plants are destroyed, in the full confidence that others quite as good will be obtained from seed in the following year.

Both in tropical and in temperate countries success with Tuberous Begonias depends on a number of small details, each one trifling in itself, but the collective result determines the robust character of the plants and the finish of the flowers. New or clean pots, a suitable mixture of soil, regular attention in watering, a temperature of not less than 56° F. (18° C.), all have an influence. But there are no difficulties in Begonia culture. Ladies in India find healthy recreation, and a relief from the tedium of long hot days, in growing specimens fit for the exhibition stage, of which professional gardeners might justly be proud.

The soil should be prepared in advance ; it may consist of sound loam, leaf-mould, and sand in about equal proportions. Perfect drainage is important, and can be secured by using broken pieces of pots ; these to be covered with cocoa-nut fibre, or any other clean material free from insects. This will prevent the soil from sifting through the pots. Instead of filling them in the usual way by one operation, put in thin layers of soil and press each one gently down until within half an inch of the rim. However carefully the soil may

COPYRIGHT S. & S.

SINGLE TUBEROUS-ROOTED BEGONIA

have been prepared, it is almost certain to contain weed-seeds. If time permit give these an opportunity of germinating, and destroy them before sowing valuable Begonia seed. Then make the surface smooth and immerse each pot up to the rim in a tub of water for half an hour. The actual sowing is a delicate task, because Begonia seed is so small that two or three hundred seeds lying in a group cover very little space. They may be mixed with a spoonful of sand, and by sowing a pinch at a time regular distribution can be secured. After sowing cover the surface with a mere dusting of sand or fine soil. When water becomes necessary, immerse the pot instead of sprinkling the soil.

Several kinds of flower seeds are erratic in the time they take to germinate, and Begonia is one of them. Thin sowing is therefore important, as the seedlings which first appear can be lifted without disturbing the remaining seeds. There should be no haste in assuming that others will not come. While waiting for seedlings to rise, prepare a heap of loam, leaf-mould, and old cow-manure in equal parts, adding sufficient sand, or crushed brick, to render the compost porous. It is worth some trouble to free the mixture from grubs of all kinds. When the seedlings are large enough to handle, fill a number of small pots with the compost, lift the young plants tenderly, pot them singly, and keep them in a moist atmosphere until they start growth. Liquid manure may then be used with advantage. When the pots are filled with roots, give increased room, and repeat the operation until the flowering size is reached.

The best time for sowing in tropical countries is from the middle of June until the end of August. In Egypt the most successful period is August and September, but plants from March and April sowings can be carried through the summer in structures covered with thin mats instead of glass. August and September suit South Africa, Australia, temperate South America, Malta, Gibraltar, Cyprus, Madeira, and Algeria; for the Argentine Republic the sowing period extends from January to September. In northern temperate latitudes seed sown in January or February is expected to produce a show of bloom during July or August.

One point must be borne in mind for hot, dry countries. The pots need to be double the size of those used in Europe. The larger bulk of soil renders the plants less liable to be quickly dried up.

COPYRIGHT S. & S.

FIBROUS-ROOTED BEGONIA

Fibrous-rooted Begonias produce a long succession of small flowers, and they may be grown under the conditions already described. This is a valuable class of plants for bedding and house decoration.

BROOM

THE White Broom, *Cytisus albus*, is grown not merely for its gracefulness as an ornamental shrub, but also for the value of its long elegant sprays of white flowers.

A very handsome variety has recently been introduced, the flowers of which are crimson and gold. Each blossom has rich crimson wings and a golden standard. Seedlings begin to bloom in the second season, and they come largely true from seed.

Broom is adapted for temperate climates, where it needs very little attention after the shrubs are established.

BROWALLIA

OF this Peruvian annual there are two colours, blue and white. Both grow about eighteen inches in height and have glossy green foliage.

Another variety, *B. speciosa major*, is a marked improvement, and makes a charming pot or border plant. The bright violet-blue flowers, relieved by a white throat, are produced with great freedom. In temperate climates this is a perpetual-flowering greenhouse perennial, very neat in habit, and of the easiest possible culture.

In countries where the south-west monsoon prevails, seed may be sown from August till November; the earlier month applies to districts having an elevation of at least 1,000 feet, and the later date to the sea level. In temperate latitudes of the southern hemisphere, seed may be sown in September or October. April and May suit the countries bordering the Mediterranean.

CACALIA COCCINEA

A HARDY annual, growing about eighteen inches high, known by the popular name of Tassel Flower. The heads of vivid orange-scarlet blossoms, borne on long stems, present a very striking appearance.

In northern temperate countries, seed is sown in borders during March and April. For Australia and South Africa the open border is suitable for the plants, which look their best when set in small groups among dwarf subjects. Seed may be sown in countries of the north torrid zone when the rainy season is nearly over, but protection from October storms will be necessary. Sow on a bed of friable soil; when the seedlings are two or three inches high, set them out in the border, or put from three to five plants in a pot. This flower is frequently employed in tropical countries as an ornament of doorsteps and verandahs which have a northern aspect.

CALANDRINIA

THE following varieties of this flower are cultivated in Europe.

C. grandiflora, a very handsome hardy annual, is a native of Chili, and grows freely in sunny situations Leaves fleshy; flowers of a bright rose colour, very showy and attractive; height about eighteen inches.

C. speciosa, also known as *C. Menziesii*, was obtained from California, and is a hardy annual. The plant is less tall than the preceding, attaining a height of only nine inches, and it thrives in open sunny borders. Stems much branched; flowers magenta-coloured.

C. umbellata is a native of Peru, and resembles Portulaca, but the flowers are much smaller. It has the same trailing habit of growth, and opens its flowers only under bright sunshine. The blossoms are of a dazzling crimson; leaves fleshy. This variety may be grown as either an annual or a biennial.

In tropical and sub-tropical countries sow where the plants are intended to bloom. As the seed is very small, waste may be avoided by mixing it thoroughly with fine sand. The date must depend on the rainfall; where it is heavy, wait until the rainy season is nearly or quite over. In many districts, however, seed can be sown in January, and the plants will bloom until the heat destroys them. The soil should be well prepared and heavily dressed with manure.

Calandrinia is extremely useful in Egypt and North Africa generally. Sown in March or April, it soon affords a fine show of bloom with very little trouble. Later in the year seed may be sown in pots for planting out the following season.

In Australia, Calandrinia is very much at home. The months for sowing are September and October.

CALCEOLARIA

COPYRIGHT R. & S.

AMONG the floral exhibits of European countries the herbaceous Calceolaria makes a conspicuous display, especially at the Royal Horticultural Society's great spring show, annually held during May in the Temple Gardens, London. The flower has been developed to extraordinary perfection, and a group of plants from one of the finest strains, grown by a master of the craft, excites intense interest among amateurs and attracts crowds of visitors. None of the continental strains approach the best grown in England. The individual flowers are of enormous size, borne in great heads, and when skilfully tied out they form an immense mass of rich and glowing colour. Yellow of all shades, from creamy white to deep tones of orange, and splendid tints of red and crimson, are the prevailing colours. Some of the flowers are pure selfs; others spotted and splashed with gorgeous crimson markings in every imaginable form. A large glass house, filled with plants of the highest type, specially selected for seed purposes, is a sight never to be forgotten, and visitors travel long distances to enjoy the display.

In the tropical plains it is impossible to grow Calceolarias of the size and quality produced in the United Kingdom. The very defects of a temperate climate favour the British gardener, and afford time for the gradual development of robust specimens, which conserve all their strength for the show of bloom and the production of seed. Sowing commences in May and ends in July. Skilled growers generally anticipate the best results from seed sown in pans during June, on a soil specially prepared in advance. The pans are covered with sheets of glass to retain moisture. In a few days the seedlings rise, are pricked off, potted on, and carefully nursed through the winter. The flower stems do not begin to show until March, when they are carefully tied out, or the heads would be weighed down under the heavy mass of bloom. As the flowers do not attain the height of their beauty until May, nearly or quite a year is occupied in bringing the plants to perfection.

In tropical countries more rapid growth renders it impossible to achieve the same results. This is no reason why Calceolarias should be considered hopeless on the hills, although it will be a vain attempt to grow them near the sea level. At an altitude of 4,000 feet, and within reach of cooling sea breezes, Calceolarias may be grown with highly satisfactory results, although not more than four months may elapse between sowing seed and the full display of bloom. In such places success in growing Calceolarias is a testimony to the invigorating character of the climate, and the weary denizen of the plains finds the pleasure of a well-earned holiday enhanced by the presence of familiar home flowers. Semi-tropical countries afford increased chances of growing Calceolarias well, and in temperate climates, having distinct seasons of cold and warm weather, the British method of treatment is wholly applicable.

Herbaceous Calceolarias should be regarded as pot plants pure and simple. A compost of soil, prepared several weeks in advance of the sowing season, should consist of rich loam, leaf-mould, and sharp sand. If a small proportion of ash from burnt vegetable refuse can be added, it will augment fertility. This mixture will be suitable both for seed-pans and the pots into which the seedlings, when ready, are to be pricked off. Perfect drainage is important, and more than the usual quantity of broken stuff should be placed at the bottom of each pan or pot. Cover the potsherds with a layer of any clean fibrous material, such as that which can be teased out of a worn-out cocoa-nut-fibre mat. On this place the mixed soil, firmly pressed down to insure equality of texture; finish the surface by making it perfectly smooth; then insert each pot or pan in water up to the rim until the soil is saturated, and on taking them out afford sufficient time for superfluous water to drain off.

Sowing is a rather delicate operation, because the seed is extremely minute. From a good strain it is literally worth many times its own weight in pure gold. The contents of a packet, consisting of hundreds of seeds, can scarcely be perceived between the thumb and forefinger. To prevent a mishap and to save needlessly thick sowing,.spread a sheet of white paper, on which place a spoonful of white fine sand ; gently shake the seed on the top and mix thoroughly. Over the smooth soil in the pots or pans sprinkle the sand and seed as evenly as possible. Dust the surface with a little fine sand, cover with a sheet of glass, and place in the shade. Moisture must be maintained by immersing the pots or pans in the manner already explained. As the seedlings rise, lift them tenderly while quite small, and prick them off with the aid of a finely pointed pencil, allowing each tiny plant a space of two inches. A little later they will need separate pots. The interval depends on the rapidity of development, and on this point the cultivator must exercise his own judgment ; but the leaves of one plant should never be allowed to overlap those of another, or decay will probably ensue. Immediately a pot is filled with roots it is time to give more room, until the flowering size is reached. After every transfer a little nursing will be necessary to insure a fresh start, and in the final stage manure-water—not too strong—should be given occasionally instead of plain water. It will promote the symmetry of the plant to pinch out the central stem immediately it shows signs of rising. The effect is to start a number of branches, and these yield a broad dwarf display.

Bedding Calceolaria is a much more hardy type of plant, capable of bearing greater exposure than its larger flowered relation. The general conditions of culture are identical for both ; but as the bedding variety is not flowered in pots, the final shift will be to beds or borders.

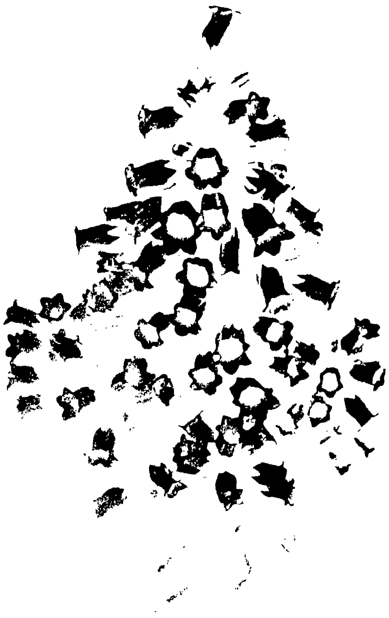
CALLIRHOE DIGITATA

A FREE-BLOOMING herbaceous perennial of the Mallow family. The bright crimson flowers are produced for a long period, and it is wise to treat the plant as an annual, sowing seed every spring in the herbaceous border where the display is wanted. As a native of the Mississippi valley this variety of Callirhoe is naturally adapted for a warm temperate climate.

In Egypt and other countries bordering the south Mediterranean, seed may be sown from September until March. September and October suit Australia, South Africa, and South America. In India, Burma, Ceylon, and the West Indies, August is the proper month for sowing where the rainfall is light, and November where it is heavy.

CAMPANULA

About a dozen varieties of Campanula are popular in European gardens. They vary in height from a few inches to four feet, and include the well-known Canterbury Bells in various colours, and the Chimney Campanula (*C. pyramidalis*). Nearly all are perennials, but the most satisfactory results are obtained in the United Kingdom by sowing early in



COPYRIGHT S. & S.

CANTERBURY BELLS

the season on gentle heat, and flowering them as annuals. They all need a very rich soil for the seed-pans, and the beds in which they are finally planted should be well tilled and freely manured.

In addition to the early sowings under glass, seed may with confidence be sown in prepared beds during April and May ; if the plants are intended to pass the winter for flowering in the following season, it will be necessary to give the shelter of a frame and mats to resist cold weather.

Campanulas are not suited for the lowlands of tropical countries, but they are entirely successful on the hills at from 5,000 to 7,000 feet above sea level. Here the culture followed in Europe is suitable, with protection from excessive sunshine by day and from radiation by night. Occasionally in high altitudes keen blasts sweep down during sunny hours, for which due provision must be made. In all cases seeds should be sown at the commencement of the growing season, whenever that may be. In the southern hemisphere

COPYRIGHT S. & S.

CAMPANULA PYRAMIDALIS ALBA

this implies sowing in September or October, instead of the months which are usual in the north.

Campanulas make very admirable pot plants for the decoration of conservatories, halls, and rooms, and in the United Kingdom they are extensively grown for this purpose.

CANDYTUFT

OF this hardy annual there are several colours, and the recent strains known as Spiral, Rocket, and Tom Thumb, have added to the attractions of a spring flower that has long been familiar in European gardens. Seed is sown at the opening of the growing season where the plant is intended to stand, and the clumps or lines are thinned to afford each plant a fair chance of attaining robust proportions and of producing fine heads of bloom. It is also common practice to sow in autumn in a nursery bed for planting out in March; the result is a great show in the bright days of early spring, before many other flowers from seeds are visible.

COPYRIGHT S. & S.

North of the Equator seed may safely be sown during August in the torrid zone at an altitude of over 1,000 feet where the rainfall does not exceed fifty inches annually. At lower altitudes the sowing may be deferred until November, or possibly a month or two later, to meet the needs of the climate. The best time will be determined on the spot; a definite rule can be of no service. In southern torrid regions sowings can be made in January and February.

For Australia, New Zealand, South Africa, and the temperate countries of South America, sowings are usual in early spring and again in autumn. November to January answers in North Africa, including Egypt; March and April are the months for Canada, China, and Japan.

CANNA

All the Cannas which are valued as ornamental plants have their origin in tropical countries. Some of them revel in hot, moist situations, where no heat appears too great, and abundant moisture only stimulates their luxuriant growth. These conditions afford the key to successful culture in every part of the world. But although heat and moisture are essential, Cannas are largely grown in temperate climates, and they make a stately show in numberless sub-tropical gardens. Splendid specimens are to be seen every year in the parks of London, Berlin, and Paris.

Formerly Cannas were grown almost exclusively as foliage plants; the flowers were comparatively unimportant. But in recent years a remarkable development has been effected in the size and beauty of the flowers, without in the least degree detracting from the ornamental character of the foliage. As a result the heads of bloom now command attention for their imposing size and superb colours. Although the improvement has been obtained in temperate countries, the tropical character of the plant remains unaltered.

The common name, Indian Shot, merely refers to the seed, which is dark, heavy, spherical, and so hard that in the West Indies it has been employed instead of shot for killing birds. Something must therefore be done to facilitate vegetation, and in hot countries it is a common practice to put the seeds into a bottle of water which is exposed to the sun for a few days. Some growers file through the hard skin, or chip a piece out of it, taking care not to injure the germ. After seeds have been soaked in water they must never be allowed to become dry, but should go straight from the bottle to pots or seed-beds. The seed may be sown separately in pots, or be planted at regular distances in beds where a temperature of about 70° F. (21° C.) will permit of their growing naturally. Both for pot culture and beds the soil should be extremely rich, and the supply of water must be regular and copious.

The season for sowing seeds of Canna in all tropical countries north of the Equator extends from May to August. For Brazil and other tropical regions south of the Equator, October to January is a suitable period. April to June for Egypt ; October and November suit Australia, Natal, and other portions of South Africa ; and for the River Plate district of South America, September or October is the proper time.

In temperate countries, and on the hills of tropical districts, sow at the opening of the growing season, making due preparations to maintain temperature at night, and to defend the young plants from the scorching sun by day.

CARNATION

THE Carnation is judged by the severe rules of the florist's standard. To grow a collection of flowers fit for keen competition necessitates the propagation of many named varieties, disbudding, shading, and other technicalities into which it is needless to enter here. Show Carnations no doubt merit all the enthusiasm devoted to them, and perfect flowers probably bring a commensurate reward in the delight of growing them and the congratulations of competitors.

For the great majority of gardens another system appeals to a wider circle and affords still greater pleasure. It has been found that seed saved with skill from the finest varieties will produce plants yielding hundreds of flowers of which the grower need not be ashamed, whether they are allowed to brighten garden borders, or are cut daily by the dozen for household adornment.

The seed-bed should be prepared with care. It must be rich, friable, and should be composed of sifted loam, leaf-mould, and a generous proportion of old manure mixed some time in advance of sowing. Make the surface even, and sow thinly in lines one foot apart, covering the seed with sand or fine soil. Afford protection from hot sunshine during the day and from keen winds at night. It is also important to rid the soil of wireworms, the larvæ of various beetles, or other pests which prey on the roots. Thin the seedlings when necessary, and if wanted, plant the thinnings in another bed. Of course the seed can be sown in pots if more convenient. When six or eight leaves are formed the plants are ready for the borders. In their final quarters liberal treatment of the soil, and regular attention with water and protection where necessary, must be continued. The result will be a display of flowers that will astonish those who grow Carnations from seed for the first time.

In South Africa, Burma, Ceylon, and India, from sowings made in October and November strong plants should be ready to begin flowering in May. For the Himalayas, March and early in May are favourable sowing months. March to May suit the Argentine Republic; August and September is the period for Algeria, Cyprus, Madeira, Malta, and Egypt.

Carnations are not always

satisfactory at the sea level of tropical countries, but they thrive on the hills under careful management.

As the flower stems rise, it is necessary to tie them to neat stakes or thin bamboos, or the plants present an untidy appearance.

CATANANCHE

TWO varieties of this perennial are grown from seed. The plants attain a height of three feet, and the flowers are everlasting; colours blue, and blue and white. The tall slender stems fit them for vase decoration either when freshly cut or in the preserved state. Catananche is hardy in Europe, and it thrives in warm temperate climates.

CELOSIA PLUMOSA

PLUMED or Feathered Cockscombs are graceful ornaments of the greenhouse and conservatory, and they afford a rich display in beds during high summer in countries having a temperate climate. Seed is sown at the commencement of the growing season in pots kept in a moist atmosphere. Under steady heat the seedlings develop in time for planting out when warm weather has set in. Celosias need a rich soil and constant attention in watering, whether they are grown in pots or beds, and the drainage must be perfect.

In tropical countries Celosias are raised and flowered with the facility of native plants. The best results are usually obtained by sowing where growth is to be finished, thinning boldly to give every specimen space to show its full beauty. Under generous treatment they make a splendid show, but if starved the growth is stunted and the colours dull.

CENTAUREA

THOSE who have studied the art of bedding find the silvery foliage of Centaurea indispensable in the production of some of the most striking effects. The two varieties chiefly cultivated are *C. ragusina* (*candidissima*) and *C. gymnocarpa*. The former has broad, the latter narrow silvery leaves. Both are perennial, and as they are derived from Italy, a warm and fairly dry temperate climate suits them.

COPYRIGHT S. & S.

CENTAUREA RAGUSINA

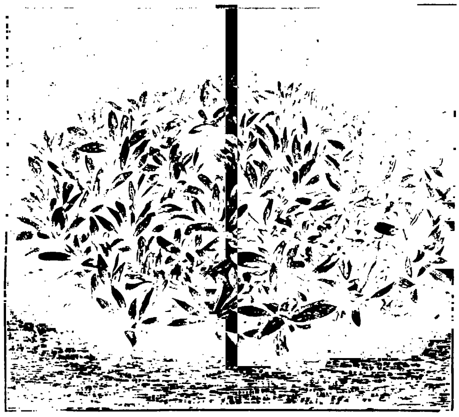
It is usual to sow seed after midsummer in pots or pans. When the seedlings are large enough, they are transferred singly to small pots, kept in a cold frame during winter, and allowed sufficient air to maintain health. With reasonable care they become strong plants for bedding out in spring. Seed may also be sown early in spring under protection; these seedlings will be ready for late summer bedding.

CENTRANTHUS

THE variety of this hardy annual which has attained the greatest popularity in gardens is *C. macrosiphon*. It is a native of Spain and thrives in warm temperate climates, where it freely produces large heads of bright red flowers; height about one foot. In northern tropical countries, at an altitude of 2,000 feet, seed is sown in August and at sea level in

November. March is the time for Europe, and September or October for the following countries: Australia, New Zealand, South Africa, and Egypt.

CERASTIUM



COPYRIGHT S. & S.

C. Biebersteinii is the variety usually preferred; it is chiefly grown for the silver-grey woolly foliage: flowers white and small. The plant is perennial, extremely useful for rock-work and edging, and is easily raised in temperate climates from seed sown on the open border in spring or summer. The illustration on page 153 shows the effect of this plant as an edging to a bed of Asters.

CHAMÆPEUCE

Two varieties are grown in gardens, both popularly known as Fish-bone Thistle. *C. casabonæ*, obtained from the South of Europe, has very ornamental green foliage, closely edged with small spines. *C. diacantha*, a native of Syria, has white variegated foliage and large marginal spines. The plants are rosette-shaped, and as specimens in borders, or placed in a mass for carpet bedding, they are exceedingly attractive. Flowers are not thrown up until the second season, but this is of no consequence as Chamæpeuce is grown for the sake of its foliage alone.

Both varieties are well suited for Egypt, Central Africa, South Africa, Australia, the dry parts of India, Burma, Ceylon, the West Indies, and South America. Plants should be raised annually from seed sown sufficiently early in spring to insure strong plants in time for the bedding season.

CHELONE BARBATA

AN admirable border plant, 3 feet high, producing long racemes of scarlet flowers. Botanically this plant belongs to the Pentstemons, but it is necessary to treat *Chelone barbata* strictly as a perennial, by sowing seed about midsummer in light rich soil, and when large enough transplanting the seedlings for a display in the succeeding year.

CHRYSANTHEMUM

FOR practical purposes, and in view of the fact that the object of these notes is to secure an effective display of flowers from seeds, it is only necessary to recognise two classes—Annual and Perennial Chrysanthemums. The former are of necessity raised from seeds; the latter by choice, because in numberless cases it is more convenient to sow seeds than to import plants or propagate by cuttings.

Annual Chrysanthemums include many varieties, and have an extensive range of rich colours in single and double flowers. They are of great service in the garden, and when grown in masses the display is brilliant and striking. They make graceful pot plants, and as cut flowers are of high decorative value for the home. All the varieties have the merit of flowering profusely, and of remaining in bloom for a long period. The most satisfactory treatment in temperate countries is to regard them as hardy annuals to be sown in spring. The culture is then extremely simple. Seed should be put in where the plants are intended to stand. Thin early and boldly, always leaving the strongest seedlings. With due attention to watering there will in a short time be a prodigal show of flowers.

COPYRIGHT S. & S

ANNUAL CHRYSANTHEMUMS

Annual Chrysanthemums deserve a really good soil and generous treatment. When preparing beds or borders, a rich dressing must be given ; in the absence of ordinary manure, bone meal is one of the best artificials for this flower. Liquid manure may also be employed occasionally with good effect.

Both spring and autumn sowings are made in the following countries: Australia, New Zealand, the Cape, and temperate South America. But for Egypt and other countries bordering the Mediterranean, autumn sowings only are advised.

The sowing season for Annual Chrysanthemums in the Nilgiri Hills, and at altitudes exceeding 3,000 feet in Ceylon, is August and September; for Southern India generally, September to November. The months last named also suit lower altitudes in Northern India, with shelter from dry north-east winds and from noonday sunshine. In all other countries affected by the south-west monsoon the same period applies. There are districts, however, where the requisite labour and attention can be more profitably devoted to the Paris Daisy and the Japanese varieties.

The Perennial Chrysanthemums include, among others, the incurved, recurved, and Japanese show varieties. These classes are grown in large numbers from seed every year, and although but a small percentage of the flowers may be equal to the show standard, they are extremely valuable as decorative subjects, and can be produced for a very trifling outlay. The Marguerite, or Paris Daisy, and the Ox-eye Daisy are also Perennial Chrysanthemums: these come quite true from seed.

COPYRIGHT S. & S.
PERENNIAL

The soil for these flowers should be rich in nitrates, phosphates, potash, and lime. These constituents can be secured by mixing a heap of turfy loam with well-rotted manure, wood ash, and bone meal. If kept moist this compost will be suitable for potting in six months from the time it is prepared.

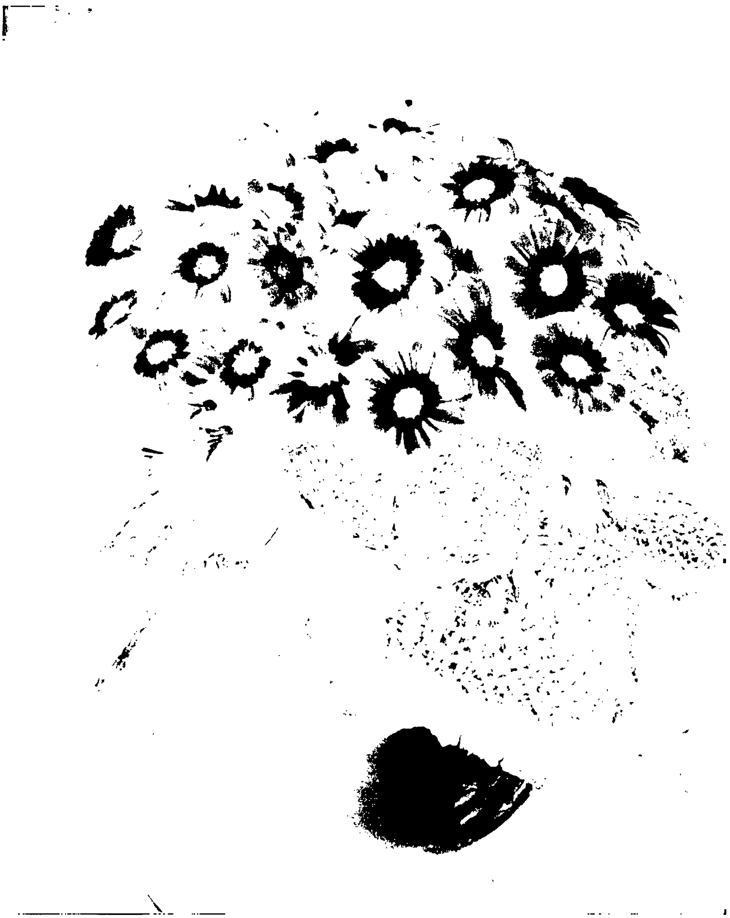
The most favourable climates for Chrysanthemums are those having distinct seasons of cold and warm weather.

In temperate countries seed is sown at the commencement of the growing season, under glass if necessary. In the tropics the sowing period extends from September to January, according to the rainfall and the altitude. Perennial Chrysanthemums are regularly grown in Northern India, and also in the south at an altitude of 2,000 feet. On the hot plains, however, the plants get no rest, and flowers of the finest named varieties soon dwindle in size. The system of growing annually from seed has therefore a special advantage.

When the seedlings are large enough to be handled they should be pricked off about 4 inches apart; on reaching a height of 5 inches they may be potted separately, or be planted out 4 feet asunder. The branches need stakes, and to secure extra large flowers for show, only one is allowed to mature on each shoot. Free drainage and regular watering are important, and before the buds appear feeding with liquid manure at short intervals will have a beneficial influence.

CINERARIA

ALTHOUGH the Cineraria bears no resemblance to the Calceolaria in form or colour, the culture of the two flowers is almost identical. The same soil, temperature, and general management suit both, although the former is rather more hardy. Seed is sown in the same months, May and June, and the two thrive best in pits, not in greenhouses, up to the time the colours are visible. Cinerarias flower in advance of Calceolarias, at a period when bright flowers are extremely valuable. The colours, however, differ widely. Cinerarias include pure white, many shades of red, magenta, and crimson; also tints of blue, violet, and purple, which are particularly rich and effective. From high-class strains the flowers frequently exceed three and sometimes four inches in diameter, and they are produced in splendid heads above robust foliage. As the plants may be grown under the conditions that suit Calceolarias, it is needless to repeat details.


COPYRIGHT S. & S.

Star Cineraria.—The art of floral decoration has been completely transformed during the last three decades.

Horticulturists of experience remember in bygone years too many instances of bouquets and groups of plants which were mere tasteless masses of colour. Happily that phase of flower torture has passed away. Artistic schemes of colour and graceful arrangement are now in public favour. Two flowers of recent introduction contribute to this advanced taste, the Star Cineraria and the Star Primula. The latter is referred to in a later page of this work. The former was introduced in 1898 by Messrs. Sutton and Sons, and it is no exaggeration to say that it has proved to be one of the most elegant decorative subjects in existence. When exhibited at

COPYRIGHT S. & S.

one of the great London shows of the Royal Horticultural Society, it instantly appealed to the refined taste of visitors, and the success of the flower was assured.

The plants make a most effective display when grouped in the greenhouse or conservatory, and single specimens for house decoration invariably win admiration. For the table this is a really beautiful plant ; the sprays last a long time in water, and admit of the most pleasing arrangements in vases with maidenhair fern or other ornamental foliage.

The culture and range of usefulness are the same as for Show Cinerarias.

C. maritima is valued as a bedding plant for its silvery-green laciniated foliage, which grows about 12 inches high.

C. acanthifolia serves a similar purpose, and the broad leaves are silvery-white.

CLARKIA

NEARLY a dozen varieties of this popular summer annual are extensively grown in the gardens of temperate countries. They all flower profusely, and in masses make a very bright and attractive display. The culture is simple ; sow where the plants are to stand, and thin to 6 inches apart. On rich soil more space may be given without weakening the effect. As Clarkias

COPYRIGHT S. & S.

are perfectly hardy, seed is sown in autumn for spring flowering, and again in spring for another show of bloom in high summer.

CLERODENDRON FALLAX

A VERY handsome shrub,.widely grown in tropical gardens, and producing at the ends of the branches large panicles of bright scarlet flowers which are displayed to advantage against the dark green foliage. Plants are easily raised from seed by sowing thinly round the margin of pots at any period of the year. Protection must be afforded from heavy rain and from direct sunshine. While quite young transfer the seedlings to separate pots, and shift on until they are finally in the ten-inch size. Loam from a fat pasture or the bank of a river, with decayed manure, and finely broken charcoal to render the mixture porous, make a suitable soil.

In all countries and districts subject to a low temperature at night, this flower must have the treatment and degree of warmth usual for stove plants.

CLIANTHUS DAMPIERI

AS a native of North and South Australia and of New South Wales, the Glory Pea is peculiarly adapted for hot, dry, and sunny positions in many lands. In Europe it is cultivated as a greenhouse annual. When sown in pots a large size should be used, because it is difficult to transfer the plants from one pot to another without causing some injury to the roots, and this almost always results in decay. For the same reason seed must be sown out of doors where the plants are intended to flower, and it is waste of time to attempt transplanting. Turfy loam, rotten manure, and crushed charcoal make an excellent compost, and the soil should be heaped up in the centre of each pot. These can be stood on a layer of ashes, and by surrounding them with stones, sun and wind are prevented from doing harm. The branches trail over the sides and show the gorgeous scarlet and black flowers to great advantage. At the collar, where the stem emerges from the soil, the plant appears to be extremely sensitive; water should not be allowed to touch it. By piling the soil high in the centre of each pot, water can, with a little care, be administered round the margin, and this need only be done at intervals of eight or ten days.

In Australia, seed is sown from July to the end of September. The opening of the season may with safety be adopted in all other countries.

COBÆA SCANDENS

A VERY handsome climber, producing large purple bell-shaped flowers; frequently the foliage is variegated. In temperate countries the plant is half-hardy, and needs to be raised in gentle heat. Although Cobæa is a perennial, the most satisfactory results are obtained by treating it as an annual. In Europe, from seed sown in February or March, the plants bloom freely in the same year. When grown in large pots, and trained up the pillars of a conservatory, the effect is very graceful and charming. The plants also thrive against sunny walls and over porches or arches. Any good soil containing finely broken lime rubbish will suit them. Sow thinly in pots, transfer to other pots of moderate size, and when established shift to final quarters.

Cobæas are grown with success in elevated districts of the tropics against buildings having a north aspect.

COCKSCOMB

COPYRIGHT S. & S.

ALL the Celosias, of which Cockscomb is one, thrive in hot climates and are easily raised from seed sown at any time during the growing season. Where the spring is cold a hot-bed is necessary to start growth. In temperate countries Cockscombs are grown exclusively as pot plants, but in the tropics they are put out in borders. Plants of high quality cannot be obtained from common strains, and even from seed saved from good strains in hot countries the combs seldom equal the parent stocks. To secure the finest specimens, seed must be saved by a skilled grower from specially selected plants.

Under forcing conditions the tendency is to run tall, but this is a defect easily remedied. Plants in pots showing good combs are boldly severed, potted, and nursed in a warm house until new roots are formed. Thus fine heads are secured on dwarf plants, fit for the show bench in a keen competition. For those in borders a different method is employed. The stems are notched in several places, a pot is cut through vertically, the plant is enclosed in the centre, and the pot filled with rich soil. After new roots are formed, the base is removed and in a few days the plant is restored to the border.

COLEUS

THREE conditions are requisite for the production of rich colours in the foliage of Coleus: a flood of shaded light, a temperature which does not fall below 60° nor rise much above 70° F. (15°–21° C.), and a regular supply of water of the same temperature as the atmosphere. Where these essentials exist, or can be provided, Coleus will flourish and exhibit a wealth of colour that cannot fail to command attention.

In countries having a cold spring, plants should be raised by sowing thinly on a hot-bed, and the seedlings can be transferred to separate pots, kept constantly moist. Drainage must be efficient, or the foliage quickly suffers.

Many named varieties exist, but such handsome specimens are now produced by sowing seed saved from a first-class strain that propagation is rapidly falling into desuetude.

COLLINSIA

COLLINSIA has the merit of thriving in town gardens, and this enhances its popularity. Two of the varieties are distinctly superior to others: *C. bicolor*, having lilac and white flowers, and *C. candidissima*, which is pure white. Both are suitable for clumps in borders, ribbon lines, or as edgings to beds. For a summer display in temperate climates seed is sown in spring where wanted, and in autumn for an early show of bloom in spring. The plant is hardy, and will endure rather a severe winter.

California is the home of this flower. In tropical and sub-tropical gardens the sowing time depends on the rainfall —August where rainfall is gentle, and November where it is heavy and the altitude low.

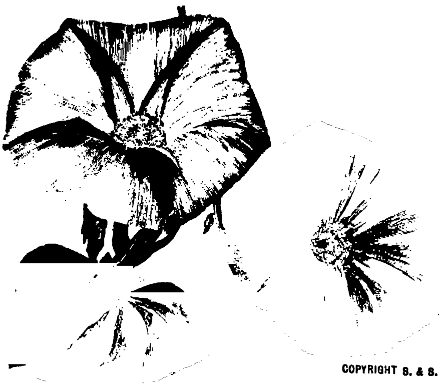
COMMELINA CŒLESTIS

ALTHOUGH this is a perennial, it will bloom in the same year that seed is sown, and therefore the culture is simplified by treating it as an annual. The foliage is glossy green, flowers bright blue, on stems about eighteen inches in height. The plant is not quite hardy in temperate climates, hence sowings in the north during February or March must be in pans under shelter, ready for planting out in May or June. In the open ground seed is sown in April.

Two species belonging to the same genus are natives of India ; it will therefore be obvious that there is no difficulty in the culture either in tropical or semi-tropical countries.

CONVOLVULUS

CONVOLVULUS MAJOR and *C. minor* are grown in almost every garden where half-hardy annuals are appreciated. The former, known also under the botanical name of *Ipomœa purpurea*, is a graceful climber which is simply indispensable for covering slender posts connected by looped strings, wire trellises, arbours, and verandahs. The flowers of many beautiful colours are seen to advantage only in the early hours of the day.



COPYRIGHT S. & S.

In Australia, South Africa, and South America, September and October are the months for sowing seed. For Canada and the Northern United States sowings in March and April may need protection, but seed can with confidence be consigned to the open ground in May. In Egypt, and other countries bordering the south of the Mediterranean, January to May is suitable for successional monthly sowings. At altitudes from 2,000 to 5,000 feet in the tropics the period of sowing extends from June to August; at a greater elevation March or April is more suitable; near the sea level November generally gives the best results, and in some districts where cold winds prevail it will be wise to wait until January.

Convolvulus minor attains the height of one foot only. The various colours are employed with splendid effect in beds and borders. Seed should be sown at the commencement of the growing season in the countries already referred to, and as the plant is hardy there is not the same need of affording protection for early sowings as in the case of *C. major*.

COREOPSIS

THE annual varieties of Coreopsis, known also as Calliopsis, thrive equally in the gardens of hot and temperate climates. They are especially successful in towns, producing flowers with great freedom and affording a prolonged display. When cut they furnish graceful decorative material for vases. The colours are yellow, with various shades of brown red, and deep crimson, all unusually bright and attractive.

In Australia and the temperate countries of South America both spring and autumn sowings are recommended. For Egypt, where Coreopsis does particularly well, fortnightly

COPYRIGHT S. & S.

sowings should be made from January until May. In the West Indies, Central Africa, Burma, Ceylon, India, and all countries subject to the south-west monsoon, the sowing should be determined by the rainfall. Where this is less than forty inches, June to September is the sowing period; but in countries subject to heavier rainfall, September is the earliest month, followed by successional sowings for three months.

COPYRIGHT S. & S.

Seed should always be sown thinly in lines, on a bed of friable soil. When about three inches high the young plants will be ready for transfer to final positions in beds, borders, or open spaces between shrubs. The varieties differ in height from one to three feet.

CORNFLOWER

IN the popular mind the colour of Cornflower, known botanically as *Centaurea Cyanus*, is limited to a full rich blue, and the flowers are supposed to be always single. On both points the common impression is wrong. White, lilac, and rose tints are winning public favour, and the double flowers are especially prized by those who have grown them.

COPYRIGHT S. & S.

In temperate countries the Cornflower is a favourite in numberless gardens. The taste for it is spreading to the tropics, where the flower is easily managed at altitudes of 5,000 to 7,000 feet, by sowing from March to May on a border protected from direct sunshine during the middle of the day, and by affording sufficient water to keep the soil moist. At a height of 2,000 feet seed may be sown in August, but near sea level sowing must be deferred until October or November. In the temperate countries of the southern hemisphere, September or October is the sowing season. Should the seedlings be too thick on the ground, transplant to four inches apart.

COSMEA BIPINNATA

THE Cosmea, or Cosmos, is a very handsome annual, with graceful feathery foliage and flowers resembling Single Dahlias. The plant attains a height of three feet, and is eminently suited for mixed borders or open spaces between shrubs where it will be somewhat protected from strong winds. To develop its fine proportions a rich soil and plenty of space are requisite.

An occasional dose of liquid manure will promote strong and rapid growth.

As Cosmea is a native of Mexico, it succeeds admirably in sub-tropical countries. North of the Mediterranean, seed is sown in spring. South of the great tideless sea, autumn is preferable. In Australia, South America, and South Africa, sowings are made both in spring and in autumn. For the Argentine Republic it has been proved by experience that August and September are the most suitable months for sowing.

COWSLIP

THIS delightful favourite of British pastures is much prized in the Colonies, and there is a considerable demand for seed. In addition to the well-known yellow of the wild flower a number of beautiful colours, including rich brown and crimson, have been developed. The plant can easily be grown on cool moist banks in any temperate climate. The suggestions as to sowing Polyanthus and Primrose are equally suitable for Cowslip, and it is no doubt the most satisfactory procedure to raise the plants in shady beds. After they have been pricked off and attain a suitable size, plant where they are wanted.

COPYRIGHT S. & S.

CRUCIANELLA STYLOSA

One of the Crucianellas was introduced into Britain from the Mediterranean region so long ago as 1640, but the variety named above has come into favour during recent years. Although it is derived from a semi-tropical climate, the plant is really hardy and succeeds in temperate and moderately warm countries. It is a perennial, allied to the Woodruff, and being only six inches high, is entirely suited for rockeries. Seed may be sown in spring and autumn in the open.

CUPHEA

It is usual to recommend the propagation of this interesting half-hardy perennial by means of cuttings. But this is quite unnecessary, as the plant comes perfectly true from seed. Three varieties, selected from a rather lengthy list, deserve precedence for the greenhouse, conservatory, and garden. The small shrub-like bushes are literally covered with elegant little tubular flowers. 'Scarlet and Gold' is described by its name, and is far the most showy and valuable of the entire class; the scarlet flowers of *C. miniata* are thrown into high relief by the green foliage; and the crimson and black blossoms of *C. platycentra* win the admiration of observers who can appreciate an exceedingly beautiful though very small flower. In justice, however, it may be said that numbers more than compensate for the small size.

In tropical gardens Cuphea seedlings may be raised by sowing seed in August or September for dry districts; or in November where the rainfall exceeds fifty inches during the four months from June to September. For warm temperate climates seed must be sown in a frame, and the plants should be grown on until they are fit for transplanting to the open. In the United Kingdom, Cuphea is properly regarded as a greenhouse or conservatory plant. Specimens are often taken into the house for adorning tables or columns specially made for vases.

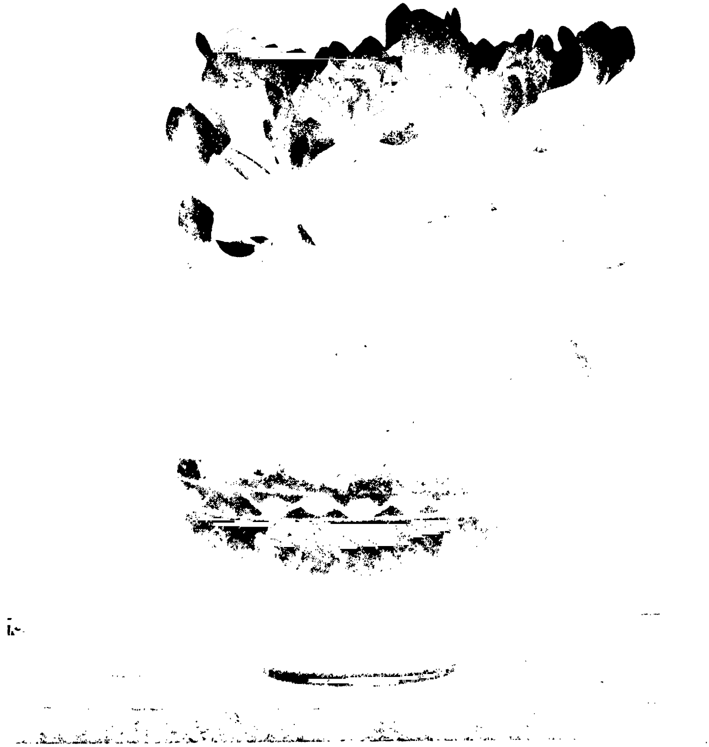
CYCLAMEN

NOWHERE can such marvellous exhibitions of Cyclamens be seen as in the seed houses of British growers who have made the development of this flower a lifelong study. One of the varieties has been aptly named White Butterfly. At a short distance a single blossom resembles a living insect with widespread wings of spotless purity. On a single plant dozens of flowers open at one time, and the exhibit of a large group at any leading horticultural show will block the avenue with admiring visitors. In immense seed houses such plants are staged by hundreds, when the effect of the snowy mass is indescribable. Other glass structures are filled with rose, pink, crimson, and purple Cyclamens, every colour displayed with heightened effect by the silvery dappled foliage. Should it happen that a few specimens of the sweet-scented variety are present, a most delightful perfume fills the atmosphere.

All the most beautiful varieties are developments of *C. persicum*, originally obtained from Greece, Palestine, and other parts of Syria. In temperate countries the flowers appear in full beauty during the short dull days of winter, and they are used to light up festive gatherings with colours which glow under artificial light.

The old method of propagating by division of the corms is no longer necessary. Fortunately it was discovered that plants from seed produced flowers in less time and of far higher quality.

For the seed-pans a rich friable soil must be prepared. But for the pots a clayey loam which has been stacked for a year is desirable ; this may be mixed with leaf-mould, together with a proportion of clean grit of any kind to insure drainage.



COPYRIGHT S. & S.

Dibble the seeds about an inch apart, and keep the pans in a moderately warm moist atmosphere, bearing in mind that Cyclamens will endure neither strong heat nor any violent change of temperature. In the cold season the thermometer should not fall below 56° nor exceed 70° F. (13°–21° C.).

The seed germinates slowly and is extremely capricious, some plants from the same seed-pod appearing weeks after other seedlings have been potted off. While growing the plants must have abundant light, although it is necessary to shade them from direct sunshine; and the free circulation of air cannot be restricted without injury to the seedlings, yet it is requisite to avoid cold draughts. These principles can be followed, perhaps under some modifications, in any part of the world, and within twelve months from sowing seed, amateur and professional horticulturists may obtain a splendid show of this very beautiful flower. In the United Kingdom October and November are the months for sowing.

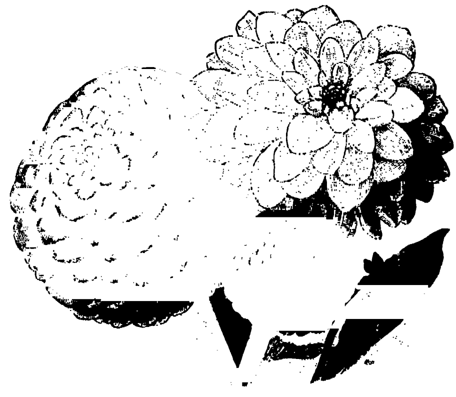
CYPERUS ALTERNIFOLIUS

THE genus to which this plant belongs numbers about seven hundred species. This particular variety was obtained from Australia, and has for many years been cultivated in Europe. In hot climates it thrives on the margins of ponds, or in pots stood in saucers of water. Moisture there must be in abundance, and a temperature of not less than 40° F. (5° C.). Fine specimens are easily and quickly grown from seed. The deep glossy green fronds resemble a miniature Palm. In temperate climates the plant is cultivated in greenhouses and conservatories; it is also used in vases for table decoration.

DAHLIA

UNTIL a few years ago a proposal to grow Dahlias from seed would have provoked a smile. As an article of commerce no seed existed. But the revived taste for single flowers, especially for Single Dahlias, called the attention of florists to a serious deficiency, and seed is now saved with great care from handsome Single, Double, and Cactus varieties. The plants possess the robust character peculiar to seedlings, they flower freely, and are an ornament to garden borders, but flowers showing prize form will be the exception rather than the rule.

The Dahlia was imported from Mexico into Spain, whence it spread through Europe. It is not hardy in temperate climates. The roots need protection through the winter months, and it is requisite to start them on hot-beds in spring. On the other hand, the plant speedily assumes a weedy appearance in hot countries that are subject to heavy and prolonged rainfall. On the hills, however, good flowers are frequently grown.


COPYRIGHT S. & S.

In Australia and New Zealand, seed should be sown on hot-beds in January. For Canada and the northern United States, from June or July sowings small roots are produced, and these, if carried through the winter in a dry store, where they cannot be injured by frost, will be ready for planting in beds or borders during the following year. This system also answers well in South Africa, although the climate of the two countries differs widely. For the Argentine Republic, August or September is a suitable time for sowing. In Egypt seed can be sown in January or February in glass houses, or in narrow lanes formed by mud walls covered with matting. The roots will be fit for planting out in April or May of the same year.

DAISY, DOUBLE

TWO colours of this familiar garden flower are extensively grown from seed for spring bedding, and the robust plants remain in bloom for several months. Double White and Firefly have a charming effect when grown in combination. From a June sowing in northern temperate latitudes the seedlings begin to flower in autumn, and produce a far more profuse display in the following spring than can be obtained from old plants.

COPYRIGHT S. & S.

Temporary residents in the tropics are always glad to see this flower in their gardens. By sowing at the beginning of the cool season, in a moist spot protected from direct sunshine, plants will be in flowering condition by Christmas. High up on the hills, Daisies grow much as in England. Seed germinates freely, and a few rows sown on a prepared border will yield hundreds of plants. Direct sunshine is to be avoided, and the supply of water must be regular.

DATURA

SEVERAL varieties of Datura grow in the tropics like weeds; for this reason they are accounted of little value, although the plants are highly ornamental. In temperate countries they are properly appreciated. The following kinds are raised from seed: *D. cornucopia*, a striking species, producing large double sweet-scented white flowers marbled with purple; height eighteen inches. *D. chlorantha flore pleno*, sweet-scented yellow trumpet-shaped flowers; height two feet. *D. ceratocaulon*, a taller variety, producing very large single pink and white sweet-scented flowers. Seeds may be sown on a hot-bed, and the seedlings while small can be transferred separately to pots. Or the sowing may be on very rich soil where the plants are to flower; only one must be permitted to remain at each station. Where there is a doubt about the richness of the soil, liquid manure can be used while the plant is growing. In a cold soil a hole should be dug for the reception of six or eight inches of fermenting manure. This, covered with earth, will bring the plants into bloom some weeks in advance of those which have no such stimulus. In all countries spring is the sowing season.

DELPHINIUM

BLUE is the rarest colour among flowers, and the perennial varieties of Delphinium offer several very beautiful shades which are much valued for garden borders. A yellow variety has also been introduced, and *D. nudicaule* has long been popular for its scarlet spikes. Delphiniums vary in height from one to five feet, and are easily raised from seed in temperate climates. The germination is capricious, instances being known where seed has lain in the ground for nearly a year and then proved its vitality. Sowings should be made at the opening of the growing season. The seedlings need to be pricked off into a prepared bed, which must be rendered

COPYRIGHT S. & S.

distasteful to slugs and other ground vermin. From this bed the plants can go straight to flowering positions, and they deserve a thoroughly tilled rich loam. If the stems are cut down immediately the first flowers lose their charm, seeding will be prevented, and another display will appear later in the season. The perennial Delphiniums seldom produce satisfactory results near the sea level in hot climates, but on the hills they are well worth growing. The Delphinium is commonly known as Perennial Larkspur. The annual varieties are referred to on page 243.

DIANTHUS

THE botanical name of Dianthus includes the Carnation, Picotee, and Pink ; these perennials receive notice in other pages under their own names. For the present purpose attention will be limited to two classes, *D. Heddewigii*, the Japan Pink, and *D. chinensis*, the Chinese, or, as it is more commonly called, the Indian Pink. Both are biennials, easily grown from seed, and they produce some of the most charming effects seen in gardens during the entire summer. The colours are singularly rich and varied, and the graceful flowers, carried on long footstalks, are admirably suited for house decoration or bouquets. The plants continue in bloom for a long period, and this adds to their importance for bedding.

In northern temperate countries the usual practice is to sow during February in pans kept in heat. After the seedlings appear, it is wise to shift them to a lower degree than is necessary to insure germination. The change hardens them, and at a later stage cool treatment is the best preparation for planting out in May. When two leaves are visible transfer to pans, allowing an inch between the plants, and at the next shift more space must be given. Where no facilities exist for raising Dianthus in heat, seed can be sown on prepared beds in June or July; the plants will bloom freely in the following year. In semi-tropical countries open-air sowings are advised at the beginning of the season, affording protection, where necessary, against biting nights and scorching sunshine. In the torrid zone both classes are grown with extreme ease. Sow in large clumps, thin to prevent crowding, and as the flowers fade remove the stems with the object of prolonging the display.

COPYRIGHT S. & S.

DIGITALIS

THE purple Foxglove, which is a native of Britain, is now the least attractive of the varieties seen in gardens. Pure white, bright yellow, and spotted flowers in almost endless variety are raised from seed every year. The plant is perennial, but is most satisfactory when grown as a biennial. In northern latitudes from sowings in May, June, or July, a fine show of flowers is obtained in the following year. Any fairly good garden soil will answer as a seed-bed. The plants should be pricked off once, and be planted in final quarters in beds or among shrubs during August or September. The Foxglove is quite at home in temperate climates, and is also successful in countries that are moderately warm. But in the tropics so many failures have been reported, that the attempt to grow it can be recommended only in specially favourable districts.

COPYRIGHT S. & S

ECCREMOCARPUS SCABER

AS a native of Chili this half-hardy evergreen climber is available for culture in nearly all parts of the world. It is useful for covering trellises, pillars, and walls with its neat graceful foliage and elegant orange-scarlet flowers. In northern temperate countries seed is sown in gentle heat during March, only a few in each pot to avoid crowding, and the plants bloom the same year. For warmer climates June is the usual time of sowing ; September or October for Australia, South Africa, and South America ; September to January for Egypt, where protection from cold wind is possible, otherwise March is the best month. This climber also does well in the southern portions of China and Japan from March and April sowings.

ECHINOPS RITRO

THIS is the well-known and popular Globe Thistle, a native of Southern Europe. The heads consist of a dense globular mass of florets of a peculiar and most attractive shade of blue. These are borne on long erect stems, which attain a height of three to four feet, giving the plant an imposing appearance in shrubbery borders. Heads are often cut for the decoration of large vases. The Globe Thistle thrives in deep dry soils of temperate and moderately warm countries. Seed is sown in spring, immediately the soil attains sufficient warmth for half-hardy plants.

EDELWEISS

VISITORS to the Alps and the Pyrenees eagerly seek this plant, which is known botanically as *Leontopodium alpinum.* The heads of flowers are a silvery white, and although on its native mountains Edelweiss is subject to severe and sudden changes of temperature, it can be grown with ease in any ordinary garden soil ; it does best, however, in moist sandy peat, especially when placed in rockeries and exposed situations. Propagation may be effected by dividing old plants, but the simplest method is to raise the required number every year by sowing seed in spring.

ERYNGIUM PLANUM

THE stems and numerous globular heads of this handsome Sea Holly are of a remarkable shade of blue, and they are justly prized for decorative purposes. As a native of Eastern Europe, the plant thrives in all countries where hardy perennials prove successful. It can be grown in ordinary garden soil kept sufficiently moist, and is useful for borders in warm and temperate climates. Seed may be sown in spring on gentle heat to bring forward a stock for summer planting, or in the open where there is no danger of injury from cold nights.

ERYSIMUM

THIS genus includes a very large number of varieties, but only four of them are worth attention in the gardens of temperate countries. E. Golden Gem is an early flowering biennial, literally covered with rich yellow flowers. From seed sown early in the year, bushy little plants will bloom in the autumn and make a renewed display in the succeeding spring. Height ten inches. *E. pulchellum* is a hardy perennial with pale yellow flowers. Height six inches. *E. arkansanum* produces bright yellow and *E. Perowskianum* orange-coloured flowers. The two latter are hardy annuals, the blossoms resembling those of a Wallflower.

ESCHSCHOLTZIA

As in the case of several other perennial garden flowers, the Eschscholtzia is most satisfactory when grown as an annual. In temperate countries seed sown at the commencement of the growing season produces plants which bloom freely in the summer of the same year. It is also a common practice to sow in autumn for insuring an early show in the succeeding spring. The plant is particularly suitable for this purpose because it transplants well, and it is one of the most useful subjects for rockeries. The colours are pure white, rose, pink, yellow, and orange. All the varieties attain about one foot in height.

COPYRIGHT S. & S.

Eschscholtzias are easily grown in warm countries on any ordinary garden soil which is not too heavy. Seed is sown in the Argentine Republic from May to August; in Egypt, South Africa, Australia, and South America during August and September, and the plants are kept through the winter for a display in the following summer.

EUCALYPTUS

The Blue Gum Tree of Australia attains considerable dimensions at home, and it has proved to be of great value

EULALIA JAPONICA VARIEGATA

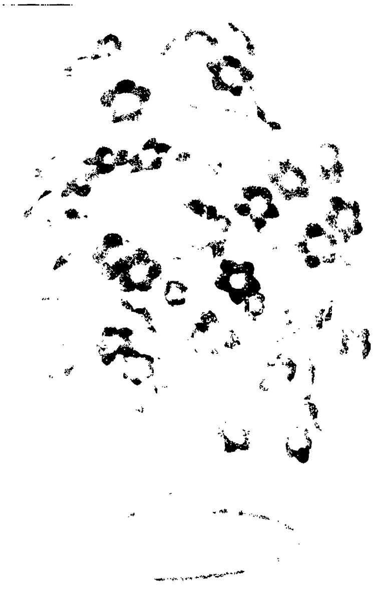
A STRONG-GROWING and exceedingly beautiful grass, having long graceful recurved leaves, elegantly striped, from three to four feet in length. In large pots or tubs this is a highly ornamental plant for cool conservatories, and it is effective as a single specimen, or in groups on lawns and among shrubs. Seed can be raised in a pot of good soil, made firm and kept moist in a shaded position. For the open, however, the question of soil need cause no anxiety. The plant does well in land differing very much in character, and fine examples are grown in quite ordinary garden borders of both temperate and moderately warm climates. It is commonly known as Japanese Zebra Grass.

EUTOCA VISCIDA

A PROFUSE-BLOOMING hardy annual, about one foot in height, with bright blue flowers. The plant thrives in the light sandy soils of temperate and tropical regions. Seed is freely sown by bee-masters.

EXACUM AFFINE

IN temperate climates it is necessary to give this plant the treatment of a greenhouse annual. With its sweetly scented bright mauve flowers it makes a beautiful dwarf pot plant. In a moist soil and a warm climate seed is easily raised in pots, and these may be allowed to stand in saucers of water during the day, but the saucers should be removed at night, or the plants will not thrive. The most suitable compost is a mixture of peat and turfy loam.



COPYRIGHT S. & S.

FERN

SPORES are saved separately of Ferns which are hardy in temperate climates, and of those which need a higher degree of heat to bring them to perfection. Some of them are evergreen, others deciduous. The decay of leaves and the period of rest may be the result of cold or of want of moisture. Peaty soil suits nearly all the Ferns, and as a rule they thrive in a moist soil and a moist atmosphere. Plants are easily raised in pots filled with good sifted soil, carefully drained. Mix the spores with fine sand to insure thin sowing, and copiously water the full pots in advance, or the spores may be washed away. Cover each pot with a sheet of glass and stand it in a saucer containing an inch of water. Place them in a close frame until the seedlings appear. With the aid of a pen transfer singly to small pots and replace these in the frame. A succession of different varieties will probably be obtained from the seed pots.

FEVERFEW

A PURE white hardy variety of Pyrethrum. This herbaceous perennial produces double flowers which are much valued in temperate climates. The plants are easily raised from seed, and they are indispensable for borders. Height about two feet.

FRANCOA RAMOSA

A CHILIAN Saxifrage, known popularly as Bridal Wreath. It is a beautiful decorative plant, of the easiest possible culture in a greenhouse. During the summer a large number of elegant sprays of pure white flowers are thrown up to a height of between two and three feet, and these are highly valued for vases, bouquets, &c. This charming plant is well adapted for high altitudes in the tropics, and may be raised on a seed-bed of friable soil by sowing in the spring, and transplanting the seedlings to another bed of similar soil, setting them four inches apart. When crowding is imminent plant out in a situation shaded from the noonday sun, allowing a space of about fifteen inches.

FRAXINELLA

A VERY interesting and well-known herbaceous perennial. Like other members of the family of Rueworts, the plants disseminate an essential oil, and on a hot day this may be so inflammable as to yield a flash of light on the introduction of a flame. In temperate climates the plant is perfectly at home in a position exposed to the sun, and it thrives in warm countries which have a distinctly cold resting season. By sowing at the beginning of the cool period in the tropics, Fraxinella can be flowered as an annual. In Australia, South Africa, and the temperate climates of South America, seed may be sown in September where the plants are to stand. The seed-bed should be rich, friable, and if the weather prove cold a seed protector will be necessary. During hot sunshine some means of shading the plants must be contrived. Sow in pots, and give the seedlings two or three shifts into larger sizes until they reach the flowering stage.

FREESIA

ALTHOUGH this is a bulbous flower and the bulbs command a large sale, the simplest procedure is to raise the required number from seed. The flowers are attractive and possess a delicious perfume which enhances their popularity. As the roots are brittle and easily injured, it is unwise to transfer the seedlings. Seed should be sown sparingly in rather large pots, thinning down to the number each pot will accommodate. By this system flowers will appear within six months from sowing.

As the Freesia is a native of South Africa, any comment on its culture for that country would be superfluous. It is also easily grown in North Africa and Australia. In the countries which border the south of the Mediterranean it is a common practice to sow a late blooming annual among the Freesias. The ground is thus fully occupied, and when the annual is removed the Freesia bulbs may be lifted after the foliage has died down in the heat of summer. Some of the hill stations in India, at an elevation of 3,000 to 5,000 feet, are peculiarly suited for the culture of Freesias ; their usefulness for vase-decoration is fully appreciated at those stations. In the Argentine Republic it is usual to sow from March to the beginning of May.

COPYRIGHT S. & S.

Freesias need abundance of light and air to prevent the stems from attaining too great a height.

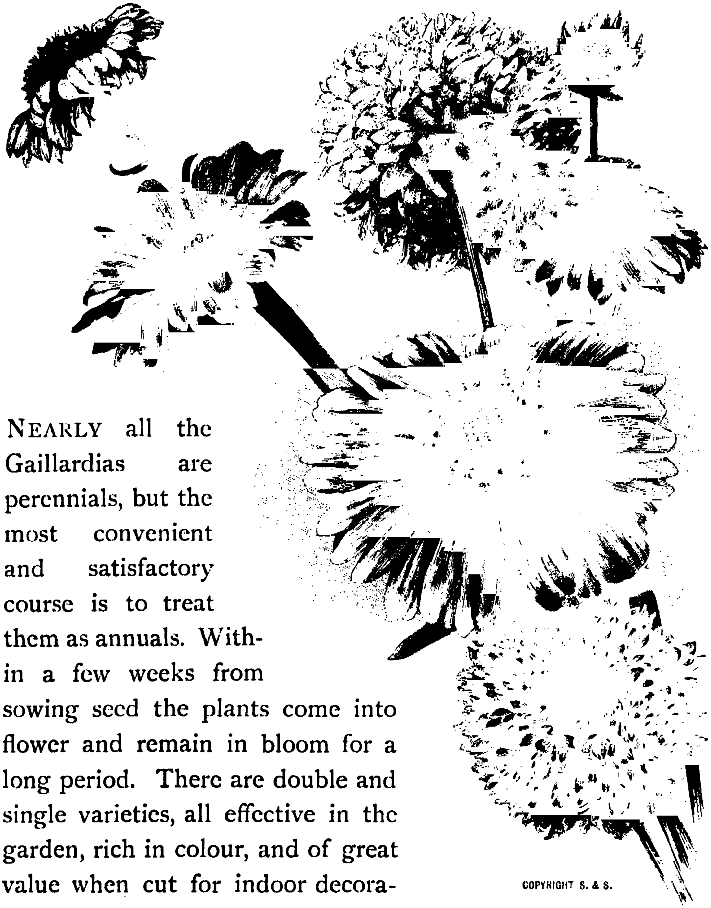
FRENCH HONEYSUCKLE

THIS hardy perennial is quite distinct from the ordinary climbing Honeysuckle. It is easily grown in open sunny gardens where the soil is rich and deep. There are two colours, red and white, and the plants attain a height of about three feet. French Honeysuckle is raised from seed in temperate and moderately warm climates by sowing at the commencement of the growing season in the open ground. It also thrives in tropical districts where the annual rainfall does not exceed fifty inches.

FUCHSIA

TO many horticulturists it will be a novelty to raise Fuchsias from seed, but fine specimens quite fit for the show bench are produced in this way. The plants are vigorous and free flowering. Where winters are severe the plants may be stored in a dry cellar during the cold months, but during the growing season both cold and excessive heat are to be avoided. In India, at an altitude of 5,000 feet, seed is sown in March, and in the succeeding cold season the plants are sent down to the plains to bloom under verandahs or in mat conservatories until the hot moist weather sets in. In temperate latitudes it is usual to sow under protection quite early in spring, using a rather firm soil for seed-pans, and a somewhat lighter but very rich soil for pots, especially for those in which the Fuchsias are to bloom.

GAILLARDIA



COPYRIGHT S. & S.

NEARLY all the Gaillardias are perennials, but the most convenient and satisfactory course is to treat them as annuals. Within a few weeks from sowing seed the plants come into flower and remain in bloom for a long period. There are double and single varieties, all effective in the garden, rich in colour, and of great value when cut for indoor decoration. Gaillardias thrive in all climates, temperate, semi-tropical, and in the torrid zone. Seed sown at the opening of the growing season where the plants are to stand must be thinned boldly to afford every specimen the opportunity of full development. But sowings may also be made in pans, or on prepared seed-beds, when the usual course of pricking off and transplanting to final quarters will be necessary. Any fairly good soil will do them justice, and only a moderate temperature is requisite to bring up the seedlings.

GENTIANA ACAULIS

A DWARF hardy perennial, only four inches high, much used for edgings and masses. The comparatively large ultramarine trumpet-shaped flowers are held vertically on short stems, and display their rich colour to advantage. The plant is a native of the Alps and the Pyrenees, and is adapted for climates that are both moist and cool.

GERANIUM

AN atmosphere charged with moisture does not suit the Geranium, but the plant thrives in dry tropical climates, and is a favourite wherever grown. Since the practice was adopted of treating the flower as an annual and raising a fresh stock of plants every year from seed, a great impetus has been given to the culture of Geraniums in all parts of the world. It is important to

COPYRIGHT S. & S.

remember that seedlings are extremely vigorous, and when planted in rich soil they form miniature trees which are very shy in flowering. By limiting the size of the pots and plunging these in borders, the plants are kept within reasonable bounds and produce a fair show of bloom.

GESNERA

ALTHOUGH the Gesnera is a perennial, it is sound practice to treat it as an annual. Very rich soil, a warm and fairly uniform temperature, and abundance of water insure luxuriant growth. In countries having a cold season, success is only attainable under the conditions which suit stove plants, but in the tropics magnificent specimens are seen in gardens where heat and moisture are favourable. The new hybrid varieties yield a profusion of beautiful flowers of various colours, such as pure white, yellow, orange, salmon-pink, rose-carmine, and rich crimson. Plants raised from seed sown early in the season bloom freely during the summer and autumn, and they are admirable for table decoration. *G. zebrina discolor* is also worth growing for the superb colour of the foliage.

The culture is identical with that of Gloxinias.

GEUM

TWO varieties of this hardy perennial are well worth growing from seed. *G. atrosanguineum* is about two feet high, and the large double scarlet flowers are much valued for cutting. *G. coccineum* attains the same height, but the flowers are single, and of a bright orange-scarlet colour. Both are effective in the garden and furnish decorative flowers for the house. Geums thrive in warm climates having a cold resting season. In South Australia, South Africa, and the temperate countries of South America, seed is sown on a bed of carefully prepared soil containing a considerable proportion of leaf-mould. When the seedlings can be handled they are transferred to another bed of similar soil, set out in rows six inches apart. Here the plants are allowed to gain strength until the following spring, when they are removed, with balls of earth surrounding the roots, to beds or borders for flowering.

GILIA

ONE of the hardy annuals much frequented by bees. Four varieties are popular in temperate climates for beds and borders. The slender stems and fine foliage of *G. dichotoma* are almost concealed by the mass of pearly white flowers, which seldom exceed six inches in height. *G. minima cærulea* is a dwarf blue variety, freely sown for edgings. Two others, *G. tricolor* and *G. nivalis*, attain a height of eighteen inches: the former is free flowering, excellent for clumps, and has lavender and white flowers with black throat; the pure snow-white flowers of the latter have an orange throat, and are delicately scented.

GLADIOLUS

FINE spikes of this noble flower may be seen in the dry regions of tropical countries, and it is scarcely necessary to say that where the Gladiolus thrives it is very highly valued. Bulbs are frequently exported from the United Kingdom during the winter months. But two points have to be considered: despatch while the roots are dormant, and the arrival at a suitable time for planting. It is not always easy to arrange a correct sequence. Here the value of seed comes in, especially for the southern hemisphere. Happily seed is now saved with so much care that a splendid display of bloom may be obtained from it, but at the outset the fact should be understood that flowers which appear in the second season must be pinched out to strengthen the corms for the production of handsome spikes in the third year.

At the opening of the season, seed is thinly sown in rather large pots to save the necessity of transferring. The pots are kept moist and in a steady temperature until the leaves die in autumn. The small bulbs are then sifted out and stored in cocoa-nut-fibre or sawdust through the winter, in some spot where they will be safe from vermin and frost. In the following March each bulb is potted singly and subsequently planted out for the summer. They are stored again for the succeeding winter, and in the spring of the third season the bulbs are planted four or five inches deep in flowering quarters.

COPYRIGHT S. & S.

GLAUCIUM

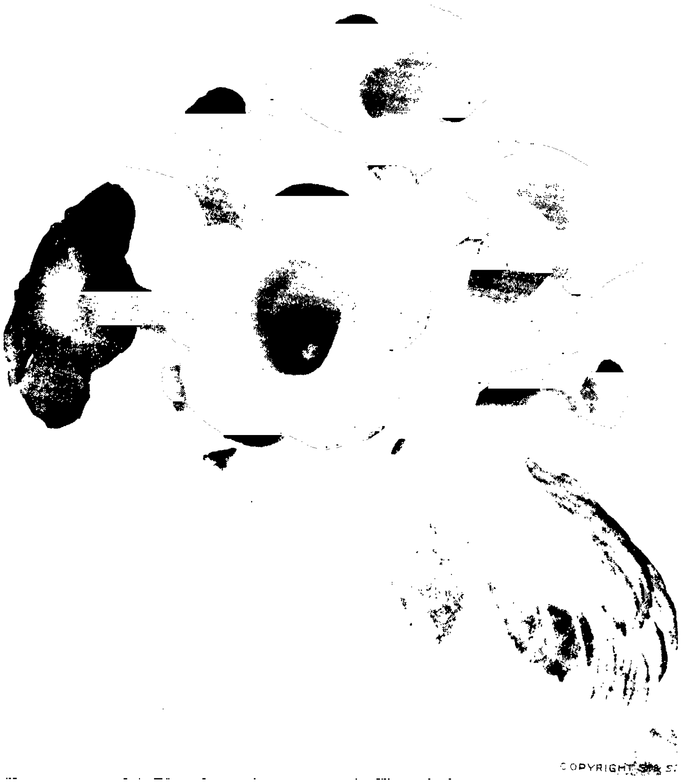
THIS hardy annual, commonly known as the Horned Poppy, is easily grown. In Europe seed is sown in spring where the plants are to flower, but in tropical countries of the northern hemisphere the usual time is August for districts having a light rainfall, and November where the rainfall is heavy.

GLOBE AMARANTH

FOR the sake of its everlasting flowers this half-hardy annual is extensively grown to furnish material for winter bouquets, and for the decoration of vases in the dull months of the year. In order to retain the full beauty of the flowers they should be cut before maturity is attained. The plant is interesting in the garden, and specimens may often be seen in conservatories and greenhouses. Seed should be sown in the open when warm weather has set in; beyond thinning the plants need very little attention.

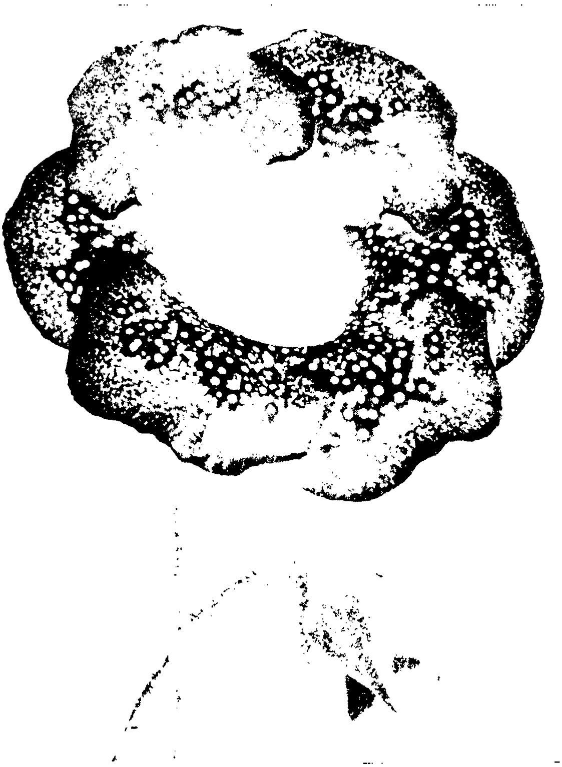
GLOXINIA

DEEPLY interesting is the history of this singularly beautiful flower, especially during the later years of the nineteenth century. Formerly named varieties were propagated by a tedious process which entailed three years' labour before the plants came into bloom. Seedlings are now flowered within six months from the date of sowing seed, and the flowers are larger in size, more perfect in form, with a variety of colour unknown under the obsolete system of culture. The drooping and horizontal varieties have both been superseded by the more elegant erect strain, which displays every blossom to the greatest advantage. Added to all this, an improvement has been effected in the foliage which materially enhances the decorative value of the plant.



SUTTON'S WHITE GLOXINIA, HER MAJESTY

Those who have never seen a well-grown collection of seedling Gloxinias have yet to witness one of the most magnificent displays of floral beauty. At great horticultural exhibitions these flowers invariably command attention for the purity, variety, and splendour of their colouring. Yet it is perfectly true that the plants are always seen in their finest condition on the greenhouse or conservatory stage



COPYRIGHT S. & S.

where they have been grown. The fact is that even with the most careful packing it is almost impossible to save them from injury while travelling.

Gloxinias should be regarded entirely as house plants, The buffeting of a high wind sadly mars their beauty, and for this reason it is unwise to plant them out, even in a suitable climate. Two conditions are essential to success: a moist atmosphere until the flowers show, when it ceases to be an advantage, and a temperature of not less than 60° F. (16° C.). The soil for the pots should be light, porous, and rich. Leaf-mould, peat, and fibrous loam are all suitable, and some growers use the three, mixed with a small proportion of fine grit to insure drainage. The pots must be either new or perfectly clean. They should be nearly filled with soil, and the seed, thinly sown, must be covered with fine earth. The pots can at once be placed in a warm position. A light sprinkling of water, of the same temperature as the house, will be needed every day. In hot dry climates a sheet of glass laid on the top of each pot will check rapid evaporation. The seedlings should be pricked off as they become ready, and it is important that the leaves of neighbouring plants should never overlap, or decay will probably set in. The final shift should be into fairly large pots, especially in hot countries where it is difficult to maintain moisture in the small sizes. Manure water during free growth will develop the plants and enrich the colour of the flowers, but when the buds are visible this stimulant must be discontinued.

In the United Kingdom it is usual to make successive sowings during January, February, and March; many growers also sow again in June or July. By judicious management a prolonged display is insured. In any climate where a temperature of 60° or 70° F. (16° or 21° C.) can be maintained for six months with a moist atmosphere, a superb show of Gloxinias can be enjoyed. It will be necessary to provide protection from cool night winds, and to afford shade from the sun's rays by day.

GODETIA

No more useful annual is sown in gardens than the free-flowering Godetia. A number of beautiful varieties are now available which come true from seed, all bright, showy, durable, and when cut the sprays remain in perfection for a long time in water. Transplanting is easy, but seldom desirable. As a rule it is wise to sow where the flowers are wanted, in either lines, clumps, or beds.

In Australia, the drier districts of New Zealand, South Africa, and South America, Godetias yield a splendid show from seed sown in September or October. For Egypt and other countries bordering the south Mediterranean, the sowing period extends from January to March. Either March or April suits Canada, but a light frame may be necessary for a short time as a protection from cold rain. In the Argentine Republic seed is sown in April, May, and again in September. At an altitude of 3,000 feet in tropical countries, splendid beds of Godetias are obtained from sowings made from June to August; and in March or April at an elevation of 7,000 feet, the precise date being decided by the altitude. August and September are the proper months for a height of 2,000 feet, and November near the sea level.

Seedlings from the last-named sowing will probably need protection from the midday sun.

Godetias are so densely covered with bloom that they deserve a good seed-bed, finely broken up, and enriched with old manure or leaf-mould. The seed should be sown thinly, and from the outset thinning should be boldly practised, so that eventually each plant will have a space of from eight to twelve inches according to the height, which varies from six inches to two feet.

COPYRIGHT S. & S.

GOLDEN FEATHER

ALTHOUGH this plant is a hardy perennial, the finest effects in bedding and edging are invariably obtained from seedlings. The best strains are particularly bright, and the variety known as Golden Ball is not only admirable in this respect, but the foliage is so finely cut as to impart a moss-like appearance to the compact little plants. Thin sowing in pans is the usual practice, and the seedlings are pricked off into boxes, two or three inches apart, in readiness for the bedding season. In Australia seed is sown in early spring in boxes kept in frames until wanted. Golden Feather is quite satisfactory in the tropics at an elevation of 3,000 feet and upwards; the sowing time is from June to August for planting out in September.

In warm and temperate climates there is not the least difficulty in producing Golden Feather from seed by the thousand, and it is worth some trouble to select those of the same age and size for geometrical work. Even as an edging to beds it makes a great difference to the finish when the plants are uniform.

GRASSES, ORNAMENTAL

SEVERAL of the Ornamental Grasses have a graceful habit which adds to the charm of the flower garden. They are also specially suited for growing in the reserve plot for the adornment of vases, table decoration, and bouquets. The flower heads should be cut before they attain complete maturity, as they are then more durable and interesting. All the Grasses in the following list thrive in tropical regions during the cool season, and in warm temperate countries during the summer. Seed may be sown on a bed of friable soil; when the Grasses have attained a few inches in height they can be lifted in small tufts with a trowel and planted firmly in a rich well-tilled bed or border.

Avena sterilis.—The flowers are in continual motion, hence the name Animated Oats.

Briza maxima.—This is a large form of the well-known Quaking Grass.

Eragrostis elegans.—A very handsome species from the tropics.

Hordeum jubatum, or **Squirrel Tail.**—An elegant barley grass from America.

Lagurus ovatus.—Called Hare's Tail from the appearance of the inflorescence.

Lamarckia aurea.—A dwarf golden-hued grass adapted for edgings.

Pennisetum longistylum.—An elegant grass from Abyssinia.

Setaria macrosæta.—A remarkable member of the genus Setaria, in which the bristles are aborted flower stalks, not awns.

Stipa pennata, or **Feather Grass.**—One of the most popular of the ornamental grasses.

The sowing season for those parts of India, Burma, Ceylon, Central Africa, and the West Indies where the rainfall is light, is June or July; for the districts having a heavy rainfall, September and October. In South Australia, South Africa, and the temperate regions of South America, September or October is suitable. For Egypt and other countries immediately south of the Mediterranean, January to April is the proper time, affording protection from cold wind. On the northern shore of the Mediterranean, in Canada, China, and Japan, March and April are the months for sowing.

GREVILLEA ROBUSTA

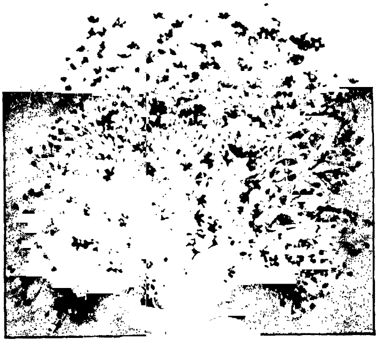
THE Australian Oak is not under consideration here for its value as a tree, but because, while quite young, it is a very beautiful greenhouse shrub, with elegant fern-like foliage, which is highly ornamental as a table plant, or when mingled with grouped flowers. It flourishes in a warm dry atmosphere, and the pots should never be placed on the ground, or the root may take hold. When the root is broken the lower foliage immediately suffers and the beauty of the plant is destroyed. The seed is capricious in germinating, sometimes starting in a few days, in other instances lying dormant for a long time. The most satisfactory plan is to sow three seeds in each pot and allow only the strongest seedling to stand. In temperate climates Grevillea is cultivated in greenhouses and conservatories, but in warm and tropical countries it is frequently planted out and grows with great rapidity.

GYNERIUM ARGENTEUM

WELL-GROWN specimens of Pampas Grass, with numerous feathery heads of flower eight feet high, make noble ornaments to lawns and shrubberies, and the finest specimens possible are grown in temperate climates. Seedlings are easily raised on a bed of rich sandy loam, made firm on the surface, and kept moist after the seed has been sown.

GYPSOPHILA

NUMEROUS species of this hardy plant are distributed over Europe and Asia. As indicated by the name, a limestone or chalky soil meets its requirements. Three varieties have become popular in the garden for their graceful panicles of flowers, borne on thin stems which have an airy lightness in vases or bouquets. *G. paniculata* is a handsome perennial attaining two feet in height. *G. elegans* and *G. muralis* are both annuals; the flowers of the former are feathery, about eighteen inches high; the latter for its dwarf growth of nine inches is suitable for rockwork and the flowers are rose-coloured. All are easily raised from seed on a prepared bed of soil freely mixed with lime or broken mortar from an old building.



COPYRIGHT S. & S.

HAWKWEED

FEW of the species of Hieracium or Hawkweed are worth growing; but the Red, White, Yellow, and Silver varieties deserve a place in the garden. They are all hardy annuals, and if sown in spring in any temperate climate, on ordinary garden soil, they will afford a bright display of bloom that will more than compensate for a trifling outlay and the labour of sowing where the plants are to flower.

HELICHRYSUM

A HARDY annual producing the well-known everlasting in several beautiful colours. In addition to clumps in the garden, where the plant is quite an ornament, a large patch should be grown in the reserve plot to produce flowers for preserving when the garden ceases to yield a supply. For this purpose they should be cut before full expansion, with the greatest length of stem possible. Tie them in small bunches and hang in a cool shed with the heads downward.

Helichrysums are easily grown in any ordinary garden soil and in all countries. Seed should be sown thinly in rows, on a finely pulverised bed, from which the seedlings can be transplanted to flowering stations. For the southern hemisphere September and October is the sowing period; April for Egypt; March or April at a height of 5,000 feet in South Africa, the West Indies, Burma, Ceylon, and India; June to August in the same countries at an elevation of 2,000 feet; and October or November at the sea level in the tropics.

HELIOTROPE

THE fragrance of the Heliotrope has secured for it the popular name of Cherry Pie. In temperate latitudes the plant is a half-hardy perennial, and as a native of Peru it naturally thrives in warm and dry tropical countries. In the Deccan when protected from the noonday sun it blooms almost continuously. There is not the least necessity for adopting the tedious process of propagating by cuttings. Robust plants can be raised in large numbers from seed, and these flower freely in beds and borders; but as they are sensitive to cold it is useless to plant them out in temperate climates until the danger of biting frosts has passed. The sowing period depends on latitude and elevation. It may be necessary to raise seedlings under protection in time to insure strong plants for the bedding season. The Heliotrope is also attractive as a pot plant, and is largely grown for greenhouses and conservatories.

HELLEBORUS NIGER

THE well-known Christmas Rose, under the protection of glass, affords a display of its beautiful pure white flowers in the depth of winter. The plant is specially adapted for temperate climates, and does not thrive under the hot winds of tropical countries. Seedlings may be raised by sowing in spring and summer, and they take a considerable time in attaining the flowering stage. The flowers are much prized for cutting at a period of the year when there is a scarcity of decorative material. The plants are dwarf, growing to the height of nine inches only.

HEUCHERA SANGUINEA

A HARDY perennial of the Saxifrage family, obtained from North Mexico in 1882. This is a charming plant for borders, rockeries, and pots. Above the dwarf compact foliage rise numerous graceful panicles of brilliant coral-red flowers, and these are much valued for house adornment and bouquets. The new Hybrids include a number of colours from light rose to dark crimson, pure white, and shades of green and brown.

Seed may be sown both in spring and autumn in all temperate and semi-tropical climates, on a bed freely enriched with leaf-mould. The seedlings will need transplanting to another bed, similarly prepared, and each plant should be allowed a space of four inches; this will develop them for the final shift to flower borders, or into pots for indoor decoration.

HIBISCUS

AMONG the numerous varieties of Mallow, two are easily raised from seed, and these deserve consideration for their usefulness and beauty. *H. africanus major*, known also under the synonym of *H. Trionum*, is a hardy annual growing about two feet high ; the primrose-coloured flowers have a deep violet eye. Concerning the culture it is only necessary to state that in nearly all countries where hardy annuals are successful, this attractive plant can be grown with very little trouble from seed sown on open beds in the usual way.

Hibiscus Manihot is a magnificent perennial, with immense soft primrose-yellow flowers having a conspicuous crimson-maroon eye. The plant blooms in the same season from early sowings, and in temperate climates needs greenhouse or conservatory culture, but in sub-tropical countries it succeeds admirably in the open. This variety also grows well and flowers freely in tropical climates if sown when heavy rain is nearly past, or when sown during the rainy season at an elevation of 2,000 to 4,000 feet. It is advisable to sow only a few seeds in each pot, and to keep these under shelter, giving abundance of light and air. In due time set the plants out singly, without injury to the roots, where they are intended to bloom, and make the soil very rich. This will have a material influence on the size of the flowers. Where the rainfall is light, it will save the check of transplanting to sow seeds in the open. Should the climate be unfavourable for full exposure, prune the tap-root when repotting, give them a rich soil and an occasional dose of clear liquid manure; the plants will afford a fine display for verandahs or in mat conservatories.

The months for sowing are April for Canada, China, and

Japan, on warm seed-beds, or May in the absence of heatin arrangements; February or March for countries bordering the south Mediterranean, and on the north shore a month later; September and October for sheltered districts of Australia, South Africa, and South America, but where cold prevails a seed-bed on a layer of warm manure will be necessary, with the further aid of a seed protector.

HOLLYHOCK

THE modern system of raising certain perennials from seed, and treating them as annuals, has not merely proved to be economical in labour and the cost of glass structures, but it has actually saved several popular flowers from annihilation by disease. The Hollyhock is one of these. Propagation by unnatural methods for a long series of years had so reduced the constitution of the plant that at one time its total disappearance from the gardens of temperate climates appeared to be imminent. It was then discovered that healthy plants could be obtained from seed, but unfortunately there was no seed in commerce worth sowing. By the energy and sound

COPYRIGHT S. & S.

judgment of a few experts, seeds are now saved from the finest double varieties with utmost care, and these may be relied on to produce a large proportion of handsome rosette-shaped flowers, so perfect in form and admirable in colour that they meet the severe demands of the florist's standard. Seedlings offer the further advantage that from early sowings stately plants may be flowered in the same season. In countries subject to winter frosts it is necessary to sow in January, in a temperature of not less than 65° F. (18° C.). The plants rise quickly and are transferred while quite small to separate pots; they are shifted again to a larger size, and gradually prepared for the open ground when warm weather renders it safe to put them out. Each stem must have the support of a stout stake, and in tying care will be necessary to avoid injury. The soil should be very rich to meet the demand made by rapid growth. Round each plant a mulch of decayed manure is beneficial, and further aid may be given with some good artificial in water.

In the tropics from June to August is a favourable sowing season. Autumn is usual for Egypt. In Australia, New Zealand, South Africa, and the temperate districts of South America, the method of treating the Hollyhock as an annual is well worth trying, but many growers still sow in summer and protect the plants through winter for a display in the following season.

The Single Hollyhock may also be raised as an annual in the manner already indicated. This charming plant has become exceedingly popular as a border subject.

HONESTY

As a flower there is not much to be said for this early-blooming hardy perennial. It is chiefly grown in temperate climates for its shining silvery seed-pods. The plant thrives under trees, in a somewhat sandy soil, and attains a height

of about two feet. There are two colours, purple and white. Seed is sown about midsummer.

HUMEA ELEGANS

WHEN well grown this Australian half-hardy perennial is singularly attractive. From a rosette of large leaves at the base, an erect stem rises to a height of four feet, having many slender gracefully drooping branches, carrying innumerable small feathery purple-brown flowers. The entire plant is sweet-scented.

It is usual to complete the growth of Humea in pots, but it can also be planted in the sub-tropical garden when warm weather can be relied on. A good porous compost is necessary for the pots. Sow thinly in July, and when transferring the seedlings the roots must not be broken. Shift on until the ten-inch size is reached, then alternate liquid manure with pure water. It takes nearly twelve months to mature the plants, and fine flower heads cannot be obtained from specimens in small pots.

Humea elegans will not submit to an excess of moisture. Should the stems or lower leaves lose a healthy colour, it is generally an indication that too much water has been given.

HUMULUS

TWO varieties of the Annual Hop are grown from seed. *H. japonicus*, the green-leaved climber, which is effective for arches, wire screens, and the pillars of verandahs; and *H. japonicus variegatus*, the leaves of which are beautifully variegated. In form the foliage resembles the Kentish Hop, and in fairly good soil it attains a height of at least ten feet. This fine annual is well adapted for all warm and sub-tropical regions. Seed should be sown at the opening of the growing season.

IBERIS

IBERIS includes both annual and perennial species of Candytuft. The annual varieties are referred to on page 175. Two of the perennial varieties are worthy of attention for their display of pure white flowers in early spring. If the heads are removed before seed is produced, new stems rise, and present a second show in a short time. As the height is only six inches, this is one of the most suitable flowers for rockwork. In borders the masses of white are often grown in association with the golden *Alyssum saxatile compactum*. A large stock of Iberis can be raised from seed sown about midsummer; the plants are put into final positions in autumn, and they may be relied on to pass safely through any ordinary winter.

ICE PLANT

THIS trailing half-hardy annual, known botanically as *Mesembryanthemum crystallinum*, is extremely interesting from the remarkable vesicles on the surface of the leaves. The icy-looking protuberances, resembling frozen drops of water, are evidently a provision of nature to enable the plant to endure drought. The foliage is largely used for garnishing, but in the flower garden the Ice Plant is seen to greatest advantage on rockeries and dry borders. In the tropics after the rainy season is over, and in all temperate countries, this annual enjoys a warm dry soil. Where cold nights are experienced in spring, it is necessary to raise seedlings under glass in readiness for planting out at the commencement of warm weather.

COPYRIGHT S & S.

IMPATIENS SULTANI

IMPATIENS SULTANI, or the Sultan's Balsam, is a native of Zanzibar and one of the brightest ornaments of the conservatory, greenhouse, and table. The brilliant rosy-scarlet flowers are produced in great profusion, and the plants retain their attractive appearance for a long period. Only a few seeds should be sown in each pot. When the seedlings are an inch high, transfer separately and shift each plant to the six-inch size, which is large enough. Use a very rich porous soil, give plenty of water, and in cool climates maintain a temperature ranging between 60° and 70° F. (15°–21° C.). The Sultan's Balsam may be successfully grown in temperate, semi-tropical, and tropical countries.

ISOLEPIS GRACILIS

A VERY charming member of the Sedge or Rush family, extensively used in Europe as a border to conservatory or greenhouse plants. When grown in small pots the drooping, slender, bright green foliage falls like a dense veil over the sides, completely hiding the pots. Seed may be sown in pans at almost any season. Good loam is suitable, and constant moisture is indispensable. As a native of tropical regions a rather high temperature is requisite to maintain health.

JACOBEA, DOUBLE

BOTANICALLY the Jacobea is known as *Senecio elegans*, a native of South Africa, and it may be treated in the manner usual with hardy annuals. The popular dwarf varieties include several beautiful colours, and the plants bloom freely, producing dense heads of double flowers much in demand for bouquets. Double Jacobea should be regarded entirely as an outdoor subject; specimens in pots are generally a mere caricature of those grown in beds or borders of rich soil.

This elegant annual is of the easiest possible culture in tropical climates during the months that intervene between the rainy and the hot seasons. If sown near the end of the rainy period the flowers will be in perfection from January to March. For temperate and semi-tropical countries of both hemispheres, the usual sowing period for hardy annuals in each district will be suitable.

KAULFUSSIA AMELLOIDES

A HARDY annual, about six inches in height, used as an edging or border to other plants. Two colours, blue and crimson, are available. In warm temperate climates seed should be sown at the beginning of the growing season where the plant is wanted. Ordinary garden soil and the accepted treatment of hardy annuals will suffice.

LANTANA HYBRIDA

REALLY fine strains of hybrid Lantana make excellent bedding plants, but they are scarcely to be recommended for pot-work because at close quarters in a confined atmosphere the scent is sometimes disliked. In the open the perfume is scarcely perceptible. The plants are shrubby and produce large heads of flowers of various brilliant colours. In some tropical countries, Ceylon for example, a wild species is an objectionable

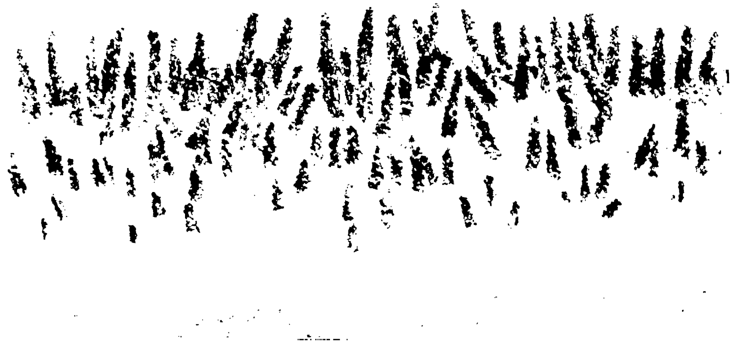
COPYRIGHT R. & S.

weed, and this raises a feeling of distrust concerning the cultivated hybrid varieties.

In temperate countries Lantanas are largely grown. Seed is sown in spring, at first under glass, but later in the open. The same rule applies to the River Plate region of South America, July under glass and November for the open. For the dry tropical districts of the northern hemisphere the beginning of the rainy season is the sowing period.

LARKSPUR

THE annual Larkspur is a true Delphinium, but it offers a far wider range of colours than the perennial varieties. The dwarf Rocket class produces immense spikes, closely set with



COPYRIGHT S. & S.

bloom, and the numerous tints can be used with striking effect for bedding, especially as they can be spaced with precision, and may be harmonised or contrasted as desired. Height about eighteen inches.

For shrubberies and borders the taller varieties, attaining three feet, are extremely pleasing; the plants branch freely, and have a most graceful appearance against a background of dark green foliage. Very few annuals present a more beautiful display of refined colours. All the Larkspurs are quite hardy, and can be grown with the least possible trouble in countries where hardy annuals are known to thrive.

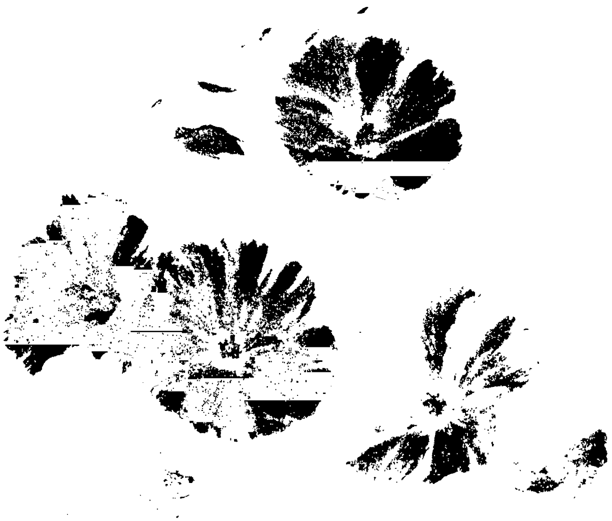
LATHYRUS LATIFOLIUS

A ROBUST-GROWING hardy perennial, commonly known as the Everlasting Pea. This plant is widely grown in temperate countries for covering wire screens, arbours, and arches. The colours are white, rose, and red, and the flowers are produced in large racemes. Seed is sown in spring where wanted.

LAVATERA

TWO varieties, of recent introduction, have by sheer merit won a high position in public favour, and they certainly deserve a prominent place in every garden. The handsome plants are covered with magnificent flowers; when cut the sprays retain their full beauty for several days. The colour of *L. rosea splendens* is a lovely rosy pink, which makes an admirable contrast to the shining pearly white flowers of *L. alba splendens.* Seed is sown in all countries at the commencement of the growing season. With the simple culture of hardy annuals a splendid display is easily obtained. As the height attained is three feet, a rich soil is imperative, and ample space must be allowed for full development.

L. arborea variegata is a border perennial with red flowers. This Tree Mallow is, however, grown solely for the beauty of its variegated foliage.



COPYRIGHT S & S.

LAVATERA ROSEA SPLENDENS AND L. ALBA SPLENDENS

(Reproduced from the picture by A. F. W. Hayward)

LAVENDER

LAVENDER is an old border favourite. and is also grown in reserve plots to supply flowers for cutting. These retain their pleasant perfume for many months, and are used in wardrobes &c. for preserving clothing from moths. Plants are easily raised from seed sown in the open in temperate and warm climates.

LAYIA

A HARDY Californian annual which is represented in gardens by two varieties: *L. elegans*, with large yellow flowers, distinctly edged with white; and *L. elegans alba*, having pure white flowers. In each case the height is one foot, and the plants remain in bloom for a long time. The greyish appearance of the stems and foliage is caused by a dense covering of soft minute hairs. Seed is sown in Europe from March to May in the open ground where the flowers are wanted. The commencement of the growing season suits other countries.

LEPTOSIPHON

SEVERAL varieties of this hardy annual are so dwarf as to be admirably suited for rock-work, edgings, and ribbon borders. They are all bright, free-flowering, and durable. As natives of California and the temperate regions of South America they are especially adapted for warm and comparatively cool climates. Seed is sown during spring in the open ground; no further trouble is entailed beyond the usual routine of thinning, and watering when necessary. Leptosiphon is one of the annuals which can also be sown in autumn for a display in early summer.

LEPTOSYNE

THIS Californian annual is not quite hardy, but it may without hesitation be sown in the open as warm spring weather approaches. The flowers resemble Marguerites, and the large lemon-yellow blossoms are carried on long stalks which enhance their value for cutting.

L. Stillmani is probably the quickest-flowering annual grown. Within five weeks from the date of sowing, the golden-yellow blossoms begin to show, and the plants continue in perfection for a long time. This variety is also of service for cutting. In Europe seed is sown in the open from March to May.

LIMNANTHES DOUGLASII

ANOTHER hardy annual derived from California, of especial value for its delicate fragrance and free-blooming character ; the yellow and white flowers are freely visited by bees ; height six inches only. Seed is sown in spring for a display in summer, and again in autumn as part of the system of enlivening beds and borders, early in the year, with bright flowers from seeds, instead of depending entirely on groups of bulbs, as is usual in northern temperate latitudes. The customary treatment for hardy annuals is all that is necessary for Limnanthes.

LINARIA

AMONG the annual species of Linaria a few varieties are as worthy of attention in the gardens of tropical lands as in colder climates. The flowers are varied in colour and very suitable for bouquets or table decoration. Seed is sown in northern temperate countries during the spring months where the plants are to bloom ; in September or October for temperate countries under the Southern Cross ; March and April, and again from September to November, for North Africa ; and in the northern tropics when the rainy season has passed.

LINUM

THE most popular species of Linum stand in the front rank of garden flowers. Four distinct colours are available, all growing freely from seed in temperate, warm, and tropical regions. *L. grandiflorum rubrum* is one of the most beautiful annuals known ; for bedding it is simply invaluable. Seed should be sown in the open during spring. The brilliant scarlet flowers are borne on slender stems, eighteen inches high. *L. flavum* is a perennial with bright yellow flowers. Early sowings are made on a hot-bed, followed by others in the open during June or July in northern temperate climates. Height twelve inches. This variety is suitable for greenhouse decoration. *L. sibiricum* is a hardy perennial, two and a half feet high ; flowers light blue, with slender foot-stalks. The sowing period is about midsummer, and when ready the seedlings are transplanted. *L. sibiricum album* is similar to the last named, but the flowers are pure white.

COPYRIGHT S. & S.

LOASA AURANTIACA

A CLIMBING plant, growing six feet high, with curiously formed bright orange flowers. It is a native of Chili and is easily cultivated from seed in temperate, semi-tropical, and tropical climates. In countries having a cold season seed is sown on a hot-bed in early spring, but where the temperature is higher it is quite safe to sow in the open.

LOBELIA

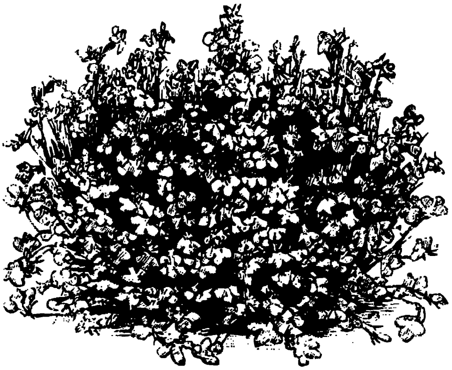
OF all the plants employed for bedding in temperate climates, probably the dwarf or compact Lobelias are most extensively grown ; and it is only where the climate nearly resembles that of its native country, the Cape Colony, that the most complete success is attained. In the tropics, at an altitude of 3,000 feet and upwards, where careful attention is given to watering, a fair show may sometimes be seen, but the effect is not then so satisfactory as in the United Kingdom. To secure densely tufted plants for bedding in May or June, seed is thinly sown either in February or March, in pans filled with sandy soil. These are kept moist in a temperature of 60° F. (15° C.) until the seedlings are large enough to be transferred to other pans or boxes, allowing plenty of space

COPYRIGHT S. & S.

LOBELIA, COMPACT

for development. A gentle heat will give them a start, and afterwards they can be gradually hardened. Every flower must be removed until the plants are in their final positions. Those who wish to have dwarf Lobelias in pots should bed a number for the purpose, and these must be lifted separately with sufficient earth attached to the roots for potting. This method will afford a finer display than can be obtained from culture entirely in pots.

In the north torrid zone, November is the date for sowing except in elevated districts where the shade temperature is about the same as that of England, when March or April is the proper time. In temperate countries of the southern hemisphere, September and October are the usual sowing months.



COPYRIGHT S. & S.

LOBELIA, SPREADING

The Spreading Lobelias are adapted for the same countries as the dwarf class, and are raised from seed under similar conditions. The former are free in habit, profuse blooming, and suited for positions where the precision which is possible with the compact varieties is not wanted. In hanging baskets and window boxes these Spreading Lobelias are extremely graceful.

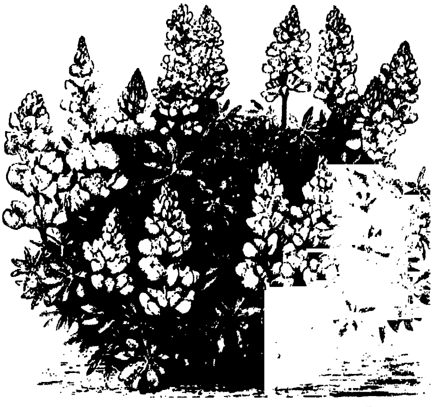
Perennial Lobelias are very handsome border flowers. L. Queen Victoria has metallic crimson foliage and vivid scarlet blossoms; and the new perennial hybrids, with their great diversity of colours, deserve attention, especially as the routine culture already described will insure plants fit for the borders in spring. Like the dwarf varieties they are partial to moisture, and the finest specimens are generally found growing in rich deep loam.

LOPHOSPERMUM SCANDENS

AN elegant half-hardy climber with large pink flowers. Support is obtained by the leaf-stalks twining themselves round string or wire provided for the purpose. In the northern tropics this plant is admirable for verandahs and trellises that are not exposed to excessive rain, but the seed is sown during the rainy season. On the southern shores of the Mediterranean it does equally well, the sowing period being from January to March. In the warm temperate countries of the southern hemisphere seed may be sown in September or October for sunny positions, or in March and April for sheltered districts.

LUPINUS

IN temperate latitudes the Lupin grows with the facility of a field crop. To prepare a bed and sow seed in shallow drills, is the whole routine of culture. There are many beautiful colours, and the handsome spikes would probably be highly prized if they cost more trouble to grow.


COPYRIGHT S. & S.

In the northern

tropics seed may be sown from March to November—the early date at high altitudes, July at 3,000 feet, August at 2,000 feet, and November at the sea level. For Australia, New Zealand, South Africa, and the temperate districts of South America, September and October are the sowing months. March suits the northern shore of the Mediterranean, while in Egypt fortnightly sowings may commence in January.

LYCHNIS

NOT one of the numerous species of Lychnis has its home within the tropics. The inference will naturally be drawn that these plants thrive especially in temperate climates and in moderately warm countries. On the hills of tropical regions no difficulty is experienced in growing the perennial varieties, under conditions which nearly correspond to those which prevail in higher latitudes. In England seed is sown in June or July on light soil, and when large enough the seedlings are transplanted to final positions. The brilliant and attractive flowers are produced in the following year. The height varies from eighteen inches to three feet.

MAIZE

ALLUSION has been made in an earlier page of this work to the value of Maize as a vegetable. It is also frequently grown in borders and shrubberies, where groups of these plants make noble ornaments. The Japanese striped variety, with its beautifully marked foliage, is incomparably superior to all others for decorative purposes. It is also effective in pots for the conservatory and verandah during the summer and autumn months. The plant is familiar in the tropics, and has been said to live on heat and thunder storms. But where cold springs prevail Maize is not hardy, and it is necessary to wait for warm weather before sowing seed. The whole routine of culture is summed up in sowing two inches deep and six inches apart on deep rich soil, thinning as may be requisite, and maintaining moisture at the roots.

COPYRIGHT S & S.

MALOPE

A LARGE-FLOWERED showy border annual, growing 2 feet high; colours white, red, and rose. It is easily raised in northern tropical gardens by sowing from August to November where the plants are wanted. In warm countries Malope is also successfully cultivated, the long tap-root going deep into the soil and finding water in dry weather while other flowers with surface roots are suffering form want of moisture. Seed is sown under glass in the United Kingdom during March, but in April or May it is safe to sow in the open border. The plant shows a preference for sandy soil.

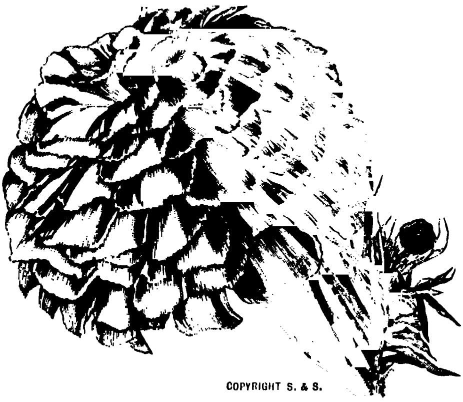
MALVA MOSCHATA

THIS handsome hardy perennial is a native of Britain, and attains a height of two feet. It produces fragrant rose-coloured flowers, two inches across, which are very attractive to bees.

There is also a beautiful white-flowered variety. Plants from seed sown in temperate climates during spring bloom in the succeeding autumn; from sowings made about midsummer they come into flower the following season.

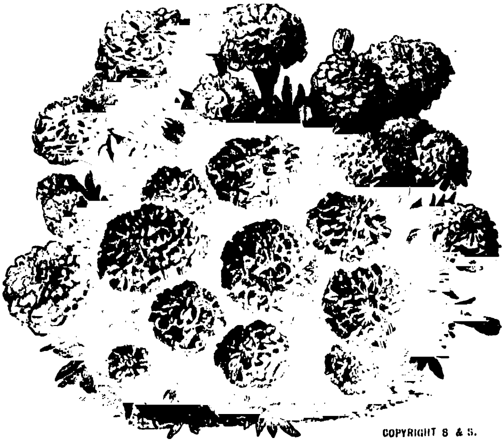
MARIGOLD

As late summer or autumnal flowers the different classes of Marigold are of almost priceless value. They endure drought, and on comparatively poor soils maintain a conspicuous show of bloom when the garden would, but for their presence, begin to wear a faded aspect. For imposing size the Double Africans take precedence. The flowers of the French class, though smaller, include not only pure colours in yellow and orange, but others which are striped and blotched with deep maroon or velvety brown. The single French flowers also have numerous admirers for their superb markings and free-flowering character. These are all half-hardy annuals and make splendid bedding plants. In northern temperate countries it is usual to sow early in pans for planting out, but in April or May seed is consigned to the open ground without the least misgiving as to its safety. All Marigolds should have a sunny position, and each plant a space of nine inches to two feet, according to the height


COPYRIGHT S. & S.

TALL FRENCH MARIGOLD

of the variety. Everywhere in the East these flowers are freely grown.



COPYRIGHT S & S.

DOUBLE FRENCH MARIGOLD

The Pot Marigolds (*Calendula officinalis fl. pl.*) include two remarkably handsome varieties, Orange King and Lemon Queen; the large flowers are double, perfectly formed, and deserve a place among the choice subjects of any garden. They do well in dry open borders having a sunny aspect.

MARVEL OF PERU

COPYRIGHT S. & S.

A BUSHY half-hardy perennial, usually treated as an annual in the United Kingdom by sowing early in spring in a frame and planting out when the weather becomes genial. In hot and moist regions this beautiful plant grows freely. June is the month for sowing in the north torrid zone; October for the south temperate zone.

MATHIOLA BICORNIS

FOR the exquisite perfume, profusely exhaled in the evening, this hardy annual is worthy of a place in every garden. Perhaps it is more generally known under the popular name of Night-scented Stock. Colour lilac; height one foot. In northern temperate countries seed is sown in the open ground in March, April, and May, according to the district. For north tropical countries the time varies from August until November, the later date where rainfall is heavy. Both spring and autumn are suitable for South Australia, New Zealand, South Africa, and the temperate regions of South America.

MATRICARIA EXIMIA

TWO beautiful hardy perennials, known as Golden Ball and Silver Ball, are grown with ease in temperate climates. The names refer to the form of the plants, which are densely crowded with double golden or white flowers. They are effective in beds or borders. Height one foot. In the United Kingdom seed is sown in pans during March, and the seedlings are potted off separately for planting out in May.

MAURANDYA PURPUREA GRANDIFLORA

A SLENDER half-hardy perennial climber, which runs to a height of ten feet; in temperate climates it is grown in the conservatory or greenhouse. In warm tropical regions the plant succeeds well in the open, and does not overload a bamboo trellis, as do some of the climbers. Sow early in the season in pots, and shift the plants to larger sizes, or plant out as may be necessary.

MELIANTHUS MAJOR

THIS handsome half-hardy perennial is adapted for the sub-tropical garden, and the light green fern-like foliage makes an admirable ornament for the conservatory. The purple flowers contain an extraordinary quantity of honey. In Europe seed is sown in March under protection. Seedlings are potted separately and planted out in May. The sowing time for southern latitudes is September or October ; for the north torrid zone, where the rainfall is light, the beginning of the wet season is suitable.

When grown in the open *Melianthus major* needs a deep, rich, well-drained soil. In pots clear liquid manure is necessary while the plants are growing fast, especially if they are plunged in a sub-tropical bed.

MESEMBRYANTHEMUM

TWO varieties are grown from seed. *M. cordifolium variegatum* is a trailing half-hardy perennial, with yellowish foliage, used with great effect for carpet bedding in temperate and warm climates. The flowers are rosy-purple. In countries or districts where cold nights prevail in spring, seed must be sown under protection in time to bring plants forward for bedding at the usual season.

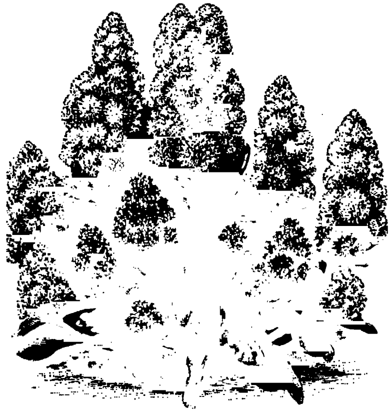
M. tricolor is a half-hardy annual, growing three inches high, adapted for sunny situations in warm countries such as Egypt, where the plant is very much at home. In tropical climates seed is sown on sandy soil after the rainy season is over.

MICHAELMAS DAISY

QUITE recently this perennial Aster has been developed into a great variety of singularly beautiful forms which have captivated the public fancy. During the autumn no more attractive plants are to be found in gardens. They are graceful in habit, densely crowded with flowers, and when grown in pots are an ornament to any cool conservatory. The height varies from two to four feet. Seed sown in February produces strong plants, which come into flower during the autumn of the same year. In all countries where the climate resembles that of England the plant will be considered an acquisition.

MIGNONETTE

IN gardens great and small, on window sills, and in pots, this fragrant flower is everywhere welcome. From the fact that self-sown seed springs up with the freedom of common weeds, it will be inferred that no cultural difficulties exist. But there is a wide difference between the size and duration of Mignonette intelligently grown, and the straggling patches which satisfy the careless. As a rule the plants in borders, and even in pots, are far too crowded. The result is feeble growth, with miserable thin spikes which scarcely stop to flower, but are prompt in running



COPYRIGHT S. & S.

to worthless seed. The conditions essential to the production of handsome spikes are few and simple. A rich heavy soil is most favourable; medium or light soils must be deeply tilled and abundantly manured; and before sowing the seed-bed should be trodden quite firm. A cool position prolongs duration, and to some extent lessens the labour of watering. Nearly all amateurs are timid in thinning, an operation needing a fearless hand. Begin early, never allowing the leaves of two plants to meet. In good soil, and under favourable conditions, the specimens may eventually stand nine, twelve, or more inches apart. The same principles apply to pot culture. Select a rich, slightly adhesive soil, and firm it into the pots, using a rather large size. Sow thinly, and do not allow more than three plants to mature in each. Under good treatment a single specimen will often yield the finer show.

In temperate climates the first sowing of Mignonette seed is usually made when the danger of frost is over, and successional sowings follow throughout the summer. For Burma, Central Africa, Ceylon, India, and the West Indies, the sowing season depends entirely on the rainfall; from August where it is light to November where it is heavy. At an elevation of 4,000 feet, March or April will generally be the suitable time.

Before dismissing this fine old favourite it is worthy of remark that much has been done in recent years to augment its value. Strains are now grown of a size unknown a few years ago, and there is a considerable choice of tints.

MIMULUS

MIMULUS is another of the hardy perennials best grown as an annual. The plants are dwarf, they flower profusely, and not only are the individual blossoms of large size but the majority are superbly marked with rich maroon. All the varieties

GIANT MIMULUS

flourish in moist retentive soil, including Musk, which is grown chiefly for its scent. On light land a shady position should be chosen, and water must be freely given.

In temperate countries seed is sown under glass early in the year for planting out at the commencement of summer weather. In the mat conservatories of the tropics, Mimulus blooms almost continuously until very hot weather sets in and kills this, as it does most other plants from temperate climates.

COPYRIGHT S. & S.

MUSK

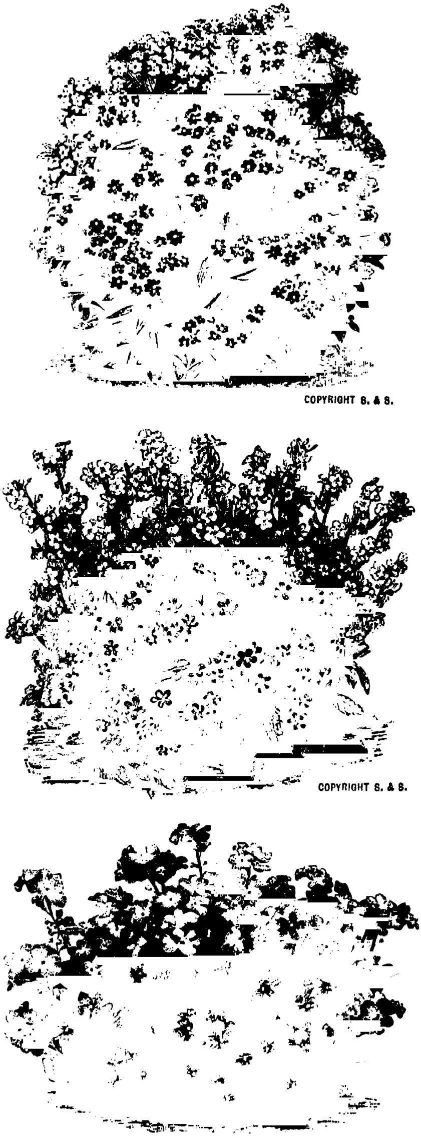
The fine strains now in vogue make excellent window plants, and they show to great advantage in conservatories and greenhouses.

MINA LOBATA

An attractive and free-flowering half-hardy climbing annual. At first the buds are a vivid red, then they change to orange-yellow, and when fully expanded become creamy white. The plant is easily raised from seed sown at the opening of the season. Protection from cold is necessary in temperate climates, and a cool exposure in the tropics.

MYOSOTIS

The popular idea that Forget-me-not will only grow on the borders of streams is quite erroneous, although the plants are more durable in a moist than in a dry soil. But even the true Water Forget-me-not (*M. palustris semperflorens*) will flower satisfactorily in a shady garden, with daily attention and a can of water. Indeed there is little difficulty in growing Myosotis in the tropics by affording shade and


COPYRIGHT S. & S.

COPYRIGHT S. & S.

COPYRIGHT S. & S.

THREE VARIETIES OF MYOSOTIS

standing the pots in saucers of water. The plant is perennial and quite hardy, but it will generally be most satisfactory to sow early in the season and give the treatment of half-hardy annuals. In cold countries it is necessary to bring Myosotis forward under protection, simply because the seed will not germinate in a low temperature.

MYRTLE

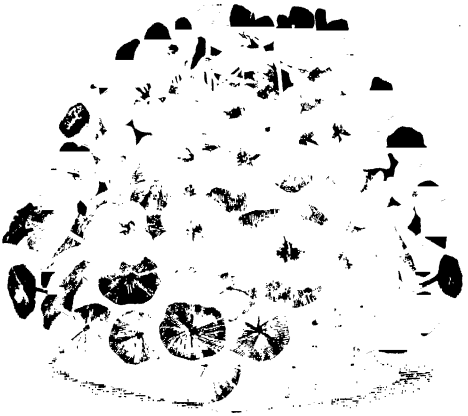
A POPULAR sweet-scented greenhouse shrub, with elegant white flowers. Height about six feet. This is a half-hardy perennial, and as a native of the South of Europe it thrives in a climate that favours the Olive and the Vine. The plant can be grown in the open in any country where the temperature does not fall quite so low as the freezing point. Seed should be sown at the beginning of the growing season, and it is useless to be impatient about germination. Frequently the seed lies dormant for a long period.

NASTURTIUM

THE genus Tropæolum includes a number of showy flowers, obtained from Mexico and Central America, which vary much in their requirements under cultivation. But two species are regarded as essential denizens of the garden. Both are extensively cultivated,

COPYRIGHT S. & S

extremely showy, durable, and they maintain a brilliant display in the waning days of autumn, when many other subjects have been gathered to the waste-heap. Another advantage of considerable importance is the fact that they entail very little trouble under treatment as hardy annuals, although the first touch of frost has precisely the same effect as fire.



COPYRIGHT S. & S.

Dwarf or Tom Thumb Nasturtiums (*Tropæolum minus*) are indispensable for the summer decoration of beds and borders. They include a number of very beautiful colours, many of them richly marked with carmine or maroon. A slight difference exists in the degree of profusion, but all are floriferous in any garden, although they exhibit their flowers to greatest advantage on poor land. When grown on rich soil the leaves overtop and hide the blossoms. August is the sowing period for Central Africa, the West Indies, Burma, Ceylon, and India, in districts where the rainfall does not exceed fifty

COPYRIGHT S. & S.

inches during the wet season; where the rainfall is greater, sowing should be postponed until November, December, or January. In the southern tropics seed is put in before the rainy season has ended. From September to March a succession of sowings can be made in Egypt. April and May suit Canada and other northern temperate climates. The seed is dibbled a few inches apart where the flowers are needed, and the plants are thinned while small.

Tropæolum majus, or Tall Nasturtium, known also as the Greater Indian Cress, is a climbing plant of considerable utility and beauty. The flower originally obtained from Peru has been developed into many very brilliant colours. In the advantage of free-flowering these splendid climbers equal their dwarf relations, and are used with striking effect in brightening the backs of borders. They are also employed for covering unsightly railings, and if allowed to trail over rocks or rough ground they produce splendid cascades of flaming colour. The Tall Nasturtiums are available for the same climates as the Dwarfs, and the seed is sown during the same months. Occasionally it may be necessary to pinch out some straggling shoot of the tall varieties, to prevent injury to other plants.

COPYRIGHT S. & S.

The flowers and leaves of both classes are edible, and as an anti-scorbutic they are used in the salad bowl. In a green state the seeds make an excellent pickle which is no mean substitute for capers.

NEMESIA STRUMOSA SUTTONI

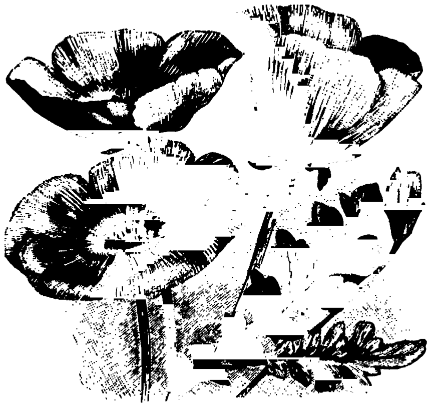
THE Royal Horticultural Society awarded a First-class Certificate for a display of this beautiful annual, after its introduction into England from South Africa by Messrs. Sutton in 1888. The distinct colours, pale yellow, rose pink, rich orange and crimson, now saved separately, greatly enhance the bedding value of the flower. By a cross effected between this variety and *N. bicolor*, a compact strain was obtained which rapidly attained popularity for its graceful habit and the ease with which it can be grown. The plant is not quite hardy, and early sowings need protection ; the pots should be kept in very gentle heat until the seedlings are hardened for planting out. Later sowings in beds or borders germinate more freely than those made under glass. In the British Colonies and India the Nemesia will doubtless become as great a favourite as in the United Kingdom. Seed sown at the opening of the growing period produces a profuse show of bloom in a very brief time. Two or three successional

COPYRIGHT S. & S.

sowings will maintain the display until the close of the season. Thin to a distance of six or eight inches. Plants should also be kept in pots, filled with rich soil, for table decoration.

NEMOPHILA

FEW of the hardy annuals are better known, or more generally cultivated, than the Nemophila. Seed is sown in autumn for an early spring display, and again in spring for another show during summer, in both cases where the flowers are wanted. There is a choice of several colours, and it is difficult to say which is the favourite, but probably the bright blue of *N. insignis* stands highest in public esteem. The fact that plants from autumn-sown seed safely emerge from the frosts and snows of winter demonstrates the usefulness of this flower for countries subject to a low temperature during the dormant period of the year. In warm countries Nemophila is also a success under shelter from direct sunshine ; but in the tropics it is worth growing only at elevations where the conditions nearly resemble those of a temperate climate.



COPYRIGHT S. & S.

NICOTIANA

THE species of Tobacco which have won a position in gardens are all half-hardy annuals. To do them justice a warm climate is necessary, but the temperature need not be tropical. In Europe seed is sown in pans during February or March; these are placed in heat, the plants are potted singly and transferred to the open when summer weather has set in. They are employed in the sub-tropical garden, in beds and borders; they are also grown in pots for corridors, verandahs, and conservatories. *N. affinis* blooms continuously with great freedom for many weeks. The large flowers are so intensely white that they appear to be almost luminous in the twilight. Both in the morning and evening a delicious perfume is exhaled. The rapid growth necessitates a very rich deep soil and regular attention with water. A mulch of decayed manure is also desirable.

COPYRIGHT S. & S.

In the tropics Nicotiana is a cool season plant. Seed is sown very thinly in September, on a bed of friable soil specially enriched with the best manure at hand. When three inches high the seedlings are transferred, if possible, to a stiff loam which has been thoroughly broken up. In lifting the plants it is a distinct advantage to prevent the soil from falling away from the roots.

NIGELLA

THIS hardy annual is commonly known as Love-in-a-Mist. Three varieties, all having finely divided, Larkspur-like foliage, are cultivated in gardens. In colour the flowers are white, light blue, and purple. Seed is sown in northern temperate climates in the open from March to May ; January to March in Egypt ; September or October in the temperate climates of Australia, South Africa, and South America. August suits northern tropical districts where the rainfall is light, and November where it is heavy.

NYCTERINIA SELAGINOIDES

A SWEET-SCENTED, white-flowered, half-hardy annual, obtained from the Cape. As the plant grows only three inches high, it is specially adapted for edgings and little nooks in rock-work. Early sowings in temperate climates must be made in pans kept in gentle heat, with the usual course of pricking off and hardening for planting out. But where the spring is warm, seed may be sown in the open. Shade from the noonday sun is necessary in the tropics.

ŒNOTHERA

THE species of Evening Primrose which are popular in gardens vary in height from six inches to four feet, and include annual, biennial, and perennial plants, hardy and half-hardy. Yellow is the predominating colour, but one variety is white, another rose, and a third spotted with crimson. In carriage drives, shrubberies, and borders, the large handsome tall-growing Œnotheras produce a striking effect. The dwarfs are admirably adapted for warm sunny borders and rock-work.

Beyond a doubt the most satisfactory method of culture is to treat them all as annuals, allowing the biennials and perennials more time to mature than is necessary for the annuals. North of the Mediterranean seed is sown in March and April; on the southern shore from January to March. In the temperate regions under the Southern Cross, September and October are the sowing months; March and April suit Canada, China, and Japan.

Œnotheras are of especial value in semi-tropical and tropical countries. They thrive in Burma, Central Africa, Ceylon, India, and the West Indies. Sowing should be determined by the rainfall; where it is not excessive August is the usual month, but where heavy rain prevails it is useless to sow before October or November.

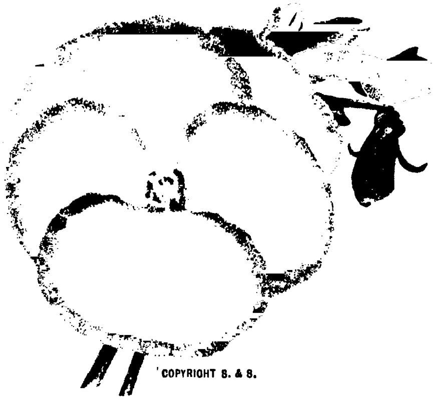
OXALIS

AMONG the numerous species of Oxalis, two of the perennials are extensively grown both in pots and gardens. *O. rosea*, with its bright rose flowers, is a very attractive pot plant. It thrives in warm and tropical climates where the rainfall is light. Seed should be sown on a sandy soil mixed with leaf-mould. In temperate latitudes sowings in early spring need the assistance of a hot-bed, and planting out must be deferred until chilly nights have passed. The seedlings are exceedingly sensitive to cold, and they manifest this objection in a most interesting manner by the rise and fall of the seed-leaves according to the variations of temperature. Great care is necessary to avoid injury when transplanting ; the safer method is to sow very thinly and remove the superfluous plants.

O. tropæoloides is a very dwarf plant, growing only three inches high. With its rich brown foliage and yellow flowers it is well suited for pot culture and rock-work. Although this variety is quite hardy, it is usual in temperate countries to sow on a hot-bed to bring the seedlings forward for planting out in early summer. When seed has ripened, the observer who brushes a hand over the foliage may receive in the face a fusillade of small seeds.

PANSY

SCOTSMEN are entitled to pride themselves on the magnificent Pansies grown in the land of pine and flood. It is therefore obvious that a cold moist climate is not an obstacle ; yet robust plants, with a full show of bloom, are no strangers to the sunny south, or even to the tropics. None the less is it true that the plant thrives naturally in a cool moist soil, and this condition should be aimed at in whatever country its culture is attempted. Pansies are easily grown from seed, the plants remain in bloom for months, and the flowers present an almost infinite diversity of colour. From sowings in early spring under protection, a display is obtained in autumn of the same year. But the usual course is to sow in high summer, and bed the plants for blooming in the following spring. Both methods are practised in Australia, South Africa, and temperate regions of the southern hemisphere. In countries bordering the Mediterranean, autumn sowings are especially successful. For northern tropical countries having a heavy rainfall, the rainy season should be near its close before seed is sown; November is the usual time. At an elevation of 2,000 feet, and with a dry climate, sowings may be made from August until October. In northern districts, where a low night temperature is allied with bright sunshine by day, it is wise to defer sowing until January. Then by affording protection from cold wind, and from the direct rays of a burning sun, the plants will bloom freely. It is important to remember that when the growth of Pansies is hurried the flowers come small.


COPYRIGHT S. & S.

COPYRIGHT S. & S.

PASSION FLOWER

TWO species of this complex and exquisitely beautiful flower are grown from seed in temperate climates. The Blue Passion Flower (*Passiflora cærulea*) is a hardy climber which bears the temperature of the south of England in favourable positions, where the soil is dry and the aspect warm. But the Scarlet Passion Flower (*Tacsonia van Volxemi*) must be grown under the protection of glass. This is a most brilliant climber for adorning the pillars and rafters of large conservatories. Both these plants can be grown in warm and tropical countries without the least difficulty. Seeds may be sown in pots at any period of the year ; the planting out should be in a rich open soil, freely mixed with lime rubbish. Perfect drainage is essential, and the plants must have sufficient water during the period of rapid growth. In the hottest districts of the tropics a cool and shaded aspect should be chosen.

COPYRIGHT S. & S.

PELARGONIUM

BOTH the large-flowered Show Pelargoniums and the Fancy varieties of British greenhouses are easily raised from seed.

Turfy loam which has been stacked with layers of decayed manure, mixed with wood or bone ash six months before use, makes the best possible compost for the pots. Where these materials are not available a good sandy loam is the best substitute. In temperate climates the plants can be flowered in any glass structure which excludes frost. All the Pelargoniums are perennials. Some growers sow in summer for a display in the following year, but the better method is to sow early in the season and follow with the treatment of annuals. In warm countries at altitudes ranging between 3,000 and 7,000 feet the plants bloom well in the open, and it is usual to put them out on shelving banks which are not exposed to full sunshine. During wet weather a little mound of fine sand round each stem will prevent the rain from doing harm. Where frosts occur the plants must have the protection of mats.

PENTSTEMON

An exceedingly handsome herbaceous perennial, producing tall profusely flowered spikes of bloom in a great variety of rich colours. In form the flowers resemble the Gloxinia, and seed saved from the best strains includes pure white, numerous shades of rose, pink, crimson, mauve, and purple, while others are edged with a contrasting colour. From seed sown in heat during January, February, or March, the plants flower in the same year. From summer sowings the seedlings are carried through winter for blooming in the following season. Pentstemons will not endure wet if followed by frost, but a cold frame, with the protection of a mat, is generally sufficient to insure safety. The climate of New Zealand, South Africa, South Australia, and of the Argentine Republic suits this plant; August is the month for sowing, but in some districts it must be under glass. Another sowing in the open is frequently made in either September or October. It is usual to sow in pans or shallow boxes filled with light soil, and while quite small the seedlings are pricked off two or three inches apart, or if more convenient they can be potted separately.

PERILLA NANKINENSIS

FOR its rich bronzy-purple foliage this half-hardy annual is much used for beds and borders. In northern temperate climates seed is raised in pans on a hot-bed or in a greenhouse; the plants are pricked off in readiness for planting out in May or June. But for late bedding, seed may be sown in the open during May where wanted. The only attention necessary will be thinning and pinching out the points to keep the plants even. September or October is the sowing period for southern temperate countries; February and March for Egypt, with full exposure to the sun to insure germination; June for districts with light rainfall in Burma, Ceylon, India, the West Indies, and Central Africa.

PETUNIA

THE superb modern strains of double and single Petunia, which have won a reputation as bedding and pot plants, have taken years of patient labour to bring to the present high standard of excellence. The doubles are immense rosettes, handsomely marked, and exquisitely fringed. Seed can be produced only by hand fertilisation, but so large a percentage comes true that propagation by cuttings has been almost discarded. The single flowers are of the fine Grandiflora type, well worth growing for their size and varied colours.

From the best strains of single Petunia it is by no means uncommon to see individual blossoms five or six inches across. Several colours are saved separately, and these are fixed in type and come quite true from seed.

For seed-pans the soil should be light, rich, and finely sifted. Sowing is a delicate operation because of the minuteness of the seed. In a temperature of about 60° F. (15° C.) it germinates quickly, and the seedlings must have prompt attention to prevent injury from crowding. Transfer to pots or pans, about an inch apart, still using a rich light compost, and see that watering is not neglected. When the plants are growing freely, it will be an advantage to use clear liquid manure occasionally instead of pure water. Potting separately

COPYRIGHT S. & S.

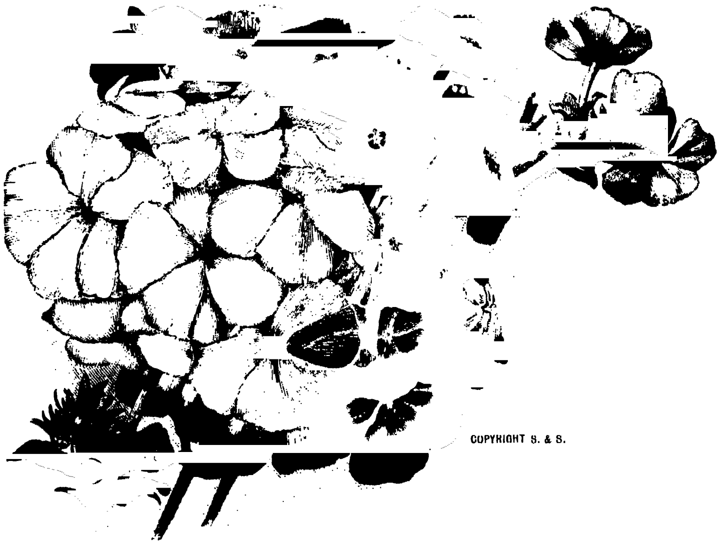
will be necessary as the plants develop. Those for beds can be put out when the weather is sufficiently warm. A night temperature of not less than 55° F. (13° C.) with 80° F. (27° C.) by day in the shade, rising to 130° F. (55° C.) in the sun, will suit Petunias admirably. These suggestions apply to the temperate regions of Europe.

In temperate Australia, South Africa, and South America, September and October are the sowing months, following the management already explained. Special success attends the culture of the Petunia as a window plant in Natal and the warmer districts of South Africa, where it also does well in beds. Sowings in Egypt during March and April furnish a fine display in the course of a few weeks. For India, Burma, Ceylon, Central Africa, and the West Indies, August suits those regions where the rainfall is light; November where it is heavy.

PHACELIA

THREE annual species of this flower are cultivated in gardens from seed. The most popular is *P. campanularia*, which offers the advantage of blooming early, and of remaining in perfection for a long period: flowers bell-shaped, bright blue, and very showy; height nine inches. *P. congesta* is rather taller; the large heads of mauve flowers resemble those of the Heliotrope. *P. tanacetifolia* grows eighteen inches high, having large compact heads of blue flowers which are valuable for bees. These are all hardy, and in northern temperate countries it is usual to sow in the open during March, April, and May. The last-named variety is also sown in autumn for an early display in the following year. In all countries where Californian or Mexican annuals thrive, seed of Phacelia may be sown at the period usual for each district.

PHLOX DRUMMONDII



THOSE who are acquainted with the original *Phlox Drummondii*, as received from Texas, and have had an opportunity of comparing it with the varied forms and brilliant colours of the finest strains now in cultivation, will be astonished at the development of this beautiful hardy annual. Two classes, which are more extensively grown every year, deserve especial attention. The large-flowered strain includes the primary colours in many charming tints, in addition to pure white; the heads of bloom are large, well formed, and make a splendid display as bedding plants. Height one foot. A reserve plot of Phloxes should be grown for table decoration and vases. Equally valuable is the dwarf compact class, growing from four to six inches high, each plant presenting a dense mass of bloom nine or ten inches across.

In countries subject to cold nights in spring, in both the northern and southern hemispheres, it is necessary to sow under protection, or the plants will not be ready when the bedding season opens. Shallow pans or boxes should be firmly filled with any good potting compost available. Each seed may be separately pressed into the soil an inch apart. This will often save pricking off, but in the event of strong growth, alternate plants can be lifted and potted separately. As the season advances seed may be sown in the open where the flowers are wanted. The tall varieties need a space of eighteen inches or two feet; ten inches is sufficient for the dwarfs.

Spring and autumn sowings are made in North and South Africa, and also in Australia. In the tropics the Annual Phloxes do exceedingly well, and monthly sowings are advisable, on the understanding that frost and continuous rain are fatal to the plants.

PICOTEE

THE distinctive feature of this flower is the beautiful contrasting edge of each petal. Show authorities recognise three grades—narrow, medium, and wide edgings. In constitution the plant resembles the Carnation, and the treatment of the two is identical. It is therefore needless to repeat details given on page 178.

Seed is now saved with great care from the finest stage plants. The colours include all the known shades, and the seedlings give great satisfaction for their robust growth and free-flowering habit.

PINK

BOTH double and single Pinks are grown from seed. The plants bloom profusely in temperate or sub-tropical climates, and make effective edgings or clumps in borders. The method of raising plants suggested under Carnation is quite suitable for Pinks, but there is less need to provide support for the flowering stems of the latter.

POLYANTHUS

COPYRIGHT S. & S.

FOR spring gardening Polyanthus is one of the most delightful flowers in all countries where conditions favour its culture. The plant is really a garden Primula, which in Europe has attained the rank of a florist's flower. But seedlings may be raised by the hundred that will brighten borders, rockwork, and beds, with beautiful and attractive masses of bloom, although the individual heads may not quite conform to the canons of the florist. The plant flourishes in temperate climates on moist rich soil, partially shaded from the sun. With constant care it may be flowered in cool districts of the tropics, but the red spider is almost always at hand, and with this minute foe it is difficult to fight in the open. In certain districts of Australia, New Zealand, South Africa, and South America the Polyanthus does exceedingly well. The simplest mode of raising seedlings is to sow about the middle of summer on a cool shaded border, and to prick them into a prepared bed about four inches apart. From this position they should be planted out, with balls of earth attached, or they can be potted for blooming indoors.

POLYGONUM

THE variety known as White Gem is an exceedingly pretty form of branching Persicaria, bearing numerous spikes of flowers which are of service for house decoration. The plant is also suitable for borders, and shows to advantage when isolated. It thrives in the tropics, especially on the banks of a reservoir or stream, where its roots can reach the water. At an elevation of 2,000 feet, the sowing period in the north extends from June until September. January to April suits Egypt; March or April the countries north of the Mediterranean. In Australia, South Africa, and South America, seed is sown at the opening of the season; the culture is the simple routine usual with hardy annuals. Height two and a half feet.

POPPY

THE lists of annual and perennial Poppies include a considerable number of double and single varieties that are indispensable for the garden. Several of them, on account of their imposing size and the Oriental splendour of their colouring, are of recognised value for the sides of carriage drives, spaces between shrubs, and other positions where bold patches of intense colour produce a telling effect. On the other hand, the delicate tints of some of the smaller varieties appeal to the most refined taste. The Shirley Poppy alone, with its almost endless gradations of exquisite tints, has enhanced the reputation of all the species. The flowers of this variety are in demand throughout the summer for vase decoration. Only by close inspection can the glossy silk-like texture of the petals be fully appreciated.

All the garden Poppies are hardy, and the culture involves no single difficulty; but in many gardens the plants are far too crowded to yield the best effects. Seed of the annual varieties should be sown at the opening of the season, where the flowers are wanted. Transplanting is sometimes attempted, but it is little better than waste of time and labour. The perennials are sown in temperate countries during summer, for blooming in the following year.

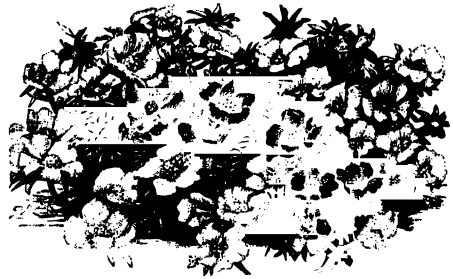
COPYRIGHT S. & S.

COPYRIGHT S. & S.

Poppies are familiar in tropical and sub-tropical climates. In the temperate zones they flourish on dry soils, and are seen to greatest advantage during the hottest summers.

PORTULACA

EXPERIENCE with this half-hardy annual in temperate climates indicates its value for dry soils and hot countries. The same conclusion might also be drawn from the fleshy character of the foliage. Under a cloudy sky, or when rain is falling, the flowers refuse to open. But in strong sunshine the blossoms unfold, and the ground is covered with a beautiful carpet of brilliant colours.



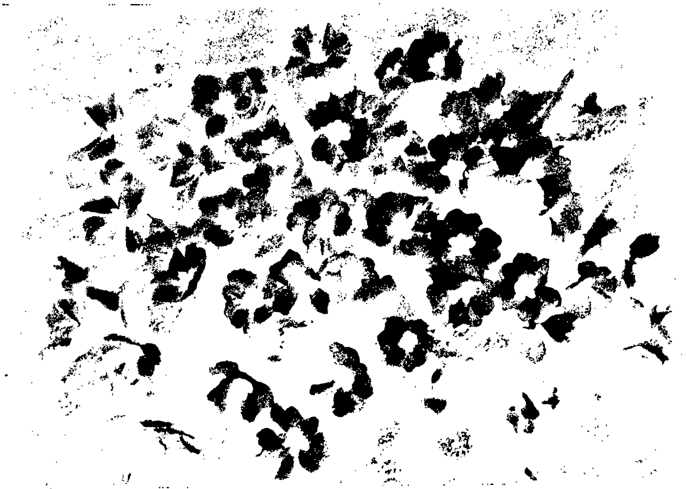
COPYRIGHT S. & S.

In countries visited by the south-west monsoon, and also in the West Indies, the sowing season extends from the beginning of September to the end of November. September or October suits Australia, New Zealand, South Africa, and the temperate countries of South America. March and April is the time for Egypt, with the aid of a frame, if necessary, as protection against rain. The same months apply to countries north of the Mediterranean. At a still higher latitude it is useless to sow until frosts cease to be dangerous. But May or June will not be too late, and the seed, which germinates with unusual rapidity, should be sown in rows nine inches apart, on raised beds of light soil. These raised beds are a distinct advantage during a rainy period. The plants need no attention beyond the destruction of weeds, and thinning to a distance of six inches in the rows.

POTENTILLA

To the horticulturist the hybrid forms of this hardy perennial are of more importance than the typical species. The flowers include various shades of yellow and rich brown, and the foliage resembles that of a Strawberry. Seed is sown in late spring or summer, on a shady bed consisting principally of leaf-mould ; later in the year the seedlings are transplanted for blooming in the following season. Both double and single varieties are grown in rockeries and gardens. The Potentilla is specially adapted for temperate climates in the northern hemisphere, South Africa, South Australia, and South America.

PRIMROSE



COPYRIGHT S. & S.

In every land where this woodland favourite can be grown it is always welcome. The colour is no longer limited to the tint distinctively known as 'primrose'; pure white, many shades of yellow, crimson, and maroon are to be found in the finest strains, and happily all possess the delicate fragrance of the wild flower. The conditions which favour its welfare are a cool moist soil, partial shade, and a comparatively low temperature. No difficulty is found in growing Primroses on the Himalayas although it may be necessary at an elevation of 6,000 feet to afford protection from cold at night. In New Zealand, ordinary garden treatment is attended with complete success.

Seed is usually sown on beds under shade about midsummer; the plants are transferred to another bed for development, and before the dormant season sets in they are planted in final positions. Seed always germinates slowly.

PRIMULA

THE true Chinese Primula (*Primula sinensis*) is insignificant in size and miserably poor in colour. But on its reception florists at once perceived in it immense possibilities. The result of their enthusiastic labours, extending over many years, is the magnificent collection of double and single flowers which now adorn conservatories, greenhouses, and homes. From so small a beginning the range of colours is amazing: snowy white in several beautiful forms, a pure Cambridge blue, diverse shades of rose, pink, scarlet, and gorgeous crimson. The splendid heads of bloom are poised just above the foliage, imparting to the plants a compact but highly decorative effect. Almost equally striking is the improvement in the foliage, especially the introduction of the fernleaf, with its varied shades of green, and the richly toned under surface.

In the climate of Great Britain it is necessary to regard the Primula strictly as an indoor plant, and perhaps not the least of its many advantages is the fact that the flowers are in full beauty during the winter months—January and February. Seed is sown in May, June, and, if a prolonged display is wanted, again in July. New or perfectly clean pots are desirable. Any really good soil will suit Primulas, but experienced growers prefer equal quantities of fibrous loam and leaf-mould, with the addition of a small proportion of clean grit to insure effective drainage. This question of drain-

COPYRIGHT S. & S.

PRIMULA, GIANT

age is important, and the pots must have a sufficient quantity of broken pottery, covered with cocoa-nut-fibre, to prevent the soil from being washed away. Press the soil firmly into the pots; immerse them in water before sowing, and put a few seeds in each ; the seeds are large enough to be spaced by hand. Germination is both slow and capricious, hence it is wise to transfer the seedlings as they become ready, pricking them off round the edges of small pots. While the seed is germinating a temperature of not less than 50° F. (10° C.) by night, nor exceeding 70° F. (21° C.) by day must be maintained, and the pots should be shaded from direct sunshine. The next shift ought to be into separate pots, and subsequently to larger sizes, always putting the plants in firmly up to the collar. Increased size should never be given until the pot is filled with roots. Gradually the plants must be exposed to the air, aiming at short stout growth and a robust constitution. A forcing temperature is injurious, but combined with cool treatment there must be protection against frost, rain, and driving winds. This system of culture has proved eminently successful with the most renowned strains of Primula grown in England, and it is applicable to all other lands having a similar temperature, except that in every case the date of sowing must be chosen to suit the seasons.

In warmer countries, where frost is unknown, a higher temperature and increased rainfall may need special precautions. But these are really minor difficulties. At many of the hill stations in the tropics, favourable conditions exist for growing handsome specimens, and the Primula is certainly worth whatever trouble or precaution may be necessary for insuring complete success.

Primula stellata (*Star Primula*).—This elegant strain of Primula, introduced by Messrs. Sutton and Sons in 1895, has attained a high position in popular favour. Although it is not intended to supersede or compete with the splendid strains of *Primula sinensis*, it is a most valuable addition to the conservatory, and will be found indispensable for general decorative work. The plants are unusually floriferous and continue in bloom for a long time. When cut, the sprays travel well and remain fresh in water many days. For table adornment Star Primulas are unsurpassed by any other greenhouse flower at their own period of the year. The culture is precisely the same as for *Primula sinensis*.

COPYRIGHT S. & S.

PRIMULA STELLATA

Primula japonica (*Japanese Primrose*). — One of the finest hardy Primroses known. It is a perennial, vigorous in growth, flowering profusely. The seed germinates very slowly, indeed this is one of the troublesome characteristics of all the species. Sow on a prepared seed-bed made in a cold frame; prick off the seedlings in a bed that can be covered with hand-lights, if necessary, and a little later set the plants out with more space for the winter, under protection from rain and frost. In spring they will be capable of blooming freely.

Primula obconica is a delightful half-hardy perennial which blooms perpetually under glass. The colours are pure white, soft lilac, and rosy pink. The plants have a high decorative value, and they are also grown to supply flowers for cutting. Except that they need a rather higher temperature, the culture is the same as for *Primula japonica.*

PRINCE'S FEATHER

A HARDY species of Amaranthus, producing handsome erect spikes, densely packed with deep crimson flowers. Height three feet. This plant is eminently suited for shrubberies and mixed borders, where it presents a stately appearance. In northern temperate climates seed is sown during March, April, or May, where wanted; and at a corresponding period in temperate countries of the southern hemisphere. In semi-tropical and tropical lands this flower is well worthy of attention.

PYRETHRUM

THE form ot Pyrethrum under consideration here is a hardy herbaceous perennial, obtained from *P. roseum*, but it has been developed into a number of beautiful colours of great value for the border. In size and form the flowers resemble Asters, and they are frequently used in bouquets. Seed is sown in high summer, and when fit the seedlings are transplanted to permanent positions, for flowering in the following spring. Height two feet.

RHODANTHE

SEVERAL colours of this hardy Everlasting flower are grown in gardens and in pots. The genus is closely allied to Helichrysum. Both need exactly the same treatment, and are successful under similar climatic conditions. It is therefore needless to repeat the details given on page 232 under Helichrysum. The height ranges from nine to twelve inches

RICINUS

THE culture of the Castor-oil Plant entails no trouble in any tropical country where a garden is possible. Effectual drainage is the only essential condition for its welfare, and where this exists the plant will endure heavy rainfall with impunity, although much rain is not necessary to its success. Ricinus is grown for its bold handsome foliage, and the rich tints in the leaves and stems of some varieties considerably enhance its ornamental character.

In temperate countries the seed should be started in heat, one seed in each pot. The seedlings must have rich soil and plenty of pot room before they are planted out at the beginning of summer. Liberal treatment, a sunny position, and protection from wind will insure imposing specimens from three to six feet high.

RIVINA HUMILIS

As a native of the Caribbee Islands this charming plant naturally thrives in sub-tropical and tropical countries. Seed may be sown at any time of the year in small pots, placed in a shady moist position. The sowing should be thin, and all the plants but the strongest must be destroyed. In temperate climates seed is sown early in the season, followed by the treatment of a greenhouse annual, although *Rivina humilis* is really a perennial. The drooping racemes of white flowers are succeeded by small red-currant-like fruits, which maintain their bright appearance for a long time.

ROCK CISTUS

A TRAILING perennial, which is quite at home among rock-work ; flowers bright and of various colours. The plant thrives in warm or temperate climates, and is readily grown under the most ordinary garden culture. In the north it is usual to sow seed from May to July, and to transplant in autumn.

ROSE

Fairy Rose.—It will probably surprise many amateurs to learn that the Fairy Rose can be raised from seed, and that the plants begin to bloom within two months from the date of sowing. The little bushes serve many useful purposes in the garden, but probably they are never more appropriately employed than as a covering for beds of Standard Roses. To produce a dense mass the plants should be closely set.

Rosa rugosa (*Japanese Rose*).—A handsome hardy shrub, with large single crimson flowers, and beautiful ornamental foliage. This Rose makes an excellent hedge, but it must be out of the reach of goats or camels, or they will make short work of it. As the seed takes a long time to germinate, it should be sown in leaf-soil, kept moist, in some position where it will not be forgotten.

RUDBECKIA

TWO species are commonly grown in gardens from seed. The annual variety, Golden Sunset, has rich yellow flowers with chestnut markings. *R. purpurea*, which is a perennial, has deep purplish petals with a dark centre. Both are excellent for cutting. Any one accustomed to sow seeds will find no trouble in raising Rudbeckia under the simplest treatment.

COPYRIGHT S. & S.

SAINTPAULIA IONANTHA

A VERY remarkable dwarf perennial, obtained from eastern tropical Africa. The plant has fleshy leaves, and the flowers, which are flat and produced in clusters, somewhat resemble the Violet, but they are much larger. Saintpaulia is an excellent table ornament, and when in bloom a row of plants in pots makes a charming margin in conservatories, either on the ground or when staged. Only six months elapse between the date of sowing and flowering. In the tropics seed may be thinly sown in June on a mixture of loam and leaf-mould, with the addition of sand or crushed shells to insure drainage. The seedlings to be potted separately in similar soil, and while young they must have protection from storms. In northern temperate countries the treatment usual for greenhouse perennials will be necessary, sowing from January to March in a temperature of 60° or 65° F. (15°-18° C.), pricking off and potting separately. The plant is only four inches high.

SALPIGLOSSIS

A HIGHLY ornamental half-hardy annual, which has been called 'the Orchid of the Annuals.' The colours include blue and gold, sulphur-white, orange, scarlet, crimson veined with gold, and rich purple. As a native of Chili Salpiglossis is adapted for warm and tropical climates north and south of the Equator. It thrives in districts having a light rainfall at an elevation of 2,000 feet, where seed may be sown in June. In August the plants will be ready for putting out into beds of deep friable loam, with shelter from the sun at midday until established. Near sea level it is unsafe to sow until October or November, but at an altitude of 5,000 feet the months are March and April. In Malta, Cyprus, and Egypt spring sowings need the protection of a garden frame.

Salpiglossis is highly valued in Australia and South

Africa. For these countries and the Argentine Republic, the sowing period is September–October. In northern temperate countries seedlings are raised on a hot-bed in March, and in April or May seed is sown in the open.

SALVIA

FROM a genus including 450 species, a small number of them have won deserved popularity as bedding or border subjects. These are half-hardy perennials, easily managed in tropical and sub-tropical gardens. Seed is sown on a bed consisting largely of leaf-mould, the seedlings are transferred before they become crowded, and are finally planted out in rich soil. A sufficient number should be potted to supply the needs of the house. Four of the species are especially worth attention: *S. patens* grows about two and a half feet high; the flowers are an intensely deep rich blue. Scarlet Queen is a very handsome Salvia, freely producing large spikes of brilliant scarlet flowers, which are thrown into relief by the deep green foliage; height two feet. *S. argentea* is grown for its large silvery-white leaves, which completely cover the ground. *S. farinacea* has lavender-blue flowers, on long handsome spikes two and a half feet high, standing well above the hoary foliage. This species is of great value as a bedding plant for the tropics.

COPYRIGHT S. & S.

In temperate climates the Salvias described are in demand for beds and borders, but it is necessary to raise the plants under heat from sowings made early in the year.

SANVITALIA PROCUMBENS

BOTH the single and the double varieties make admirable bedding or edging plants. The flowers are yellow; height six inches. Sanvitalia is not strictly hardy, but by deferring the sowing until about the middle of spring, it may be successfully grown under the treatment usual with hardy annuals in all countries where they thrive.

SAPONARIA

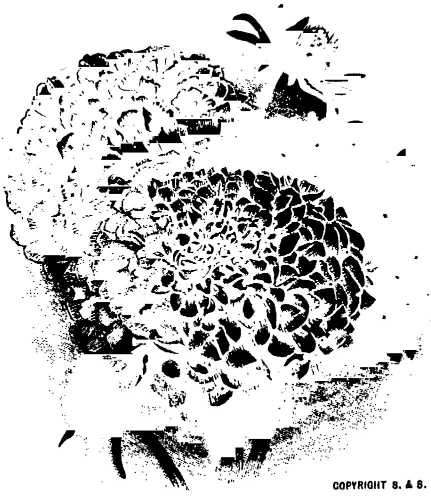
SOME of the hardy annual Saponarias are sown in autumn for an early show in the following year, and again in spring for a display during summer. Three varieties produce white, pink, and rosy-scarlet starry flowers. The height is only six inches, and they make a beautiful display in small beds or when massed in borders.

S. ocymoides is an elegant trailing perennial, with pretty rose-coloured flowers, specially suited for rock-work.

There is not the smallest difficulty in growing Saponarias in any quarter of the globe.

SCABIOUS

SWEET SCABIOUS has not escaped the improving hand of the hybridiser. The finest large-flowered strains now include colours ranging from pure white, pink, and red to purplish-black. In size the individual blossoms have been greatly increased, and they are freely used for bouquets,



or for vase decoration. Scabious thrives in the cold season of the tropics, therefore seed must be sown when the rainy period is nearly or quite over. Although the plant is a perennial, it is found most convenient in temperate countries to treat it as an annual, by sowing under protection early in spring, and transplanting when genial weather sets in. Or seed may be sown towards the end of spring where the plants are intended to bloom. All the varieties are three feet high, except Tom Thumb, which seldom attains twelve inches.

SCHIZANTHUS

FOR both the house and the garden the species of greatest value is *S. pinnatus* with its numerous varieties, and the recently introduced compact forms considerably enhance its usefulness, especially as a pot plant in the conservatory or on the table. The delicate colouring and free-blooming habit of this hardy annual will everywhere be appreciated. One secret of success is to avoid extremes of heat or cold, and in warm countries

COPYRIGHT S. & S.

the time of sowing should be chosen with this end in view. In temperate latitudes spring culture under glass, and summer culture in the open, exactly suit this flower.

SEDUM CÆRULEUM

THE genus Sedum, or Stonecrop, includes about 120 species, nearly all having white or yellow flowers. *S. cæruleum* is, however, an exception, the flowers being a charming pale blue. The plant grows only three inches high, and is a suitable ornament for rock-work, or for covering stony nooks in any part of the garden. As it will also grow on walls or old ruins, the kind of soil need not constitute a difficulty. Although this Sedum is a perennial, it is best grown as an annual. In temperate climates, for which it is naturally adapted, no trouble is experienced in raising plants from seed sown in pans. When established they will almost take care of themselves.

SENSITIVE PLANT

A WELL-KNOWN perennial shrub, which closes its leaves when touched, and faithfully registers the waxing and waning sunlight, even during an eclipse. As the plant is derived from tropical Mexico, it thrives in all hot countries subject to heavy rainfall. Seed is sown at the beginning of the rainy season. In temperate regions sowings must be made in heat during the spring. To avoid transplanting, very few seeds should be put into each pot, allowing only one vigorous seedling to stand.

SILENE

COPYRIGHT S. & S.

SEVERAL very beautiful varieties of Silene, or Catchfly, are grown in gardens from seeds, and recent introductions have increased the importance of a flower which is now freely sown on rockeries and in beds. *S. orientalis*, with its large heads of Clove-scented blossoms, is of special service in perennial borders. Height three feet. Some of the annual varieties grow four inches high; others one foot. They bloom profusely, are nearly all of some shade of rose, or white tinted with rose, and one has golden-yellow foliage. The Silene thrives in temperate climates, where seed may be sown in both spring and autumn. One of the most effective uses for this flower is to sow on beds planted with bulbs; it carpets the ground with green, and when the stems of bulbs are cut down, presents glowing masses of colour.

SMILAX

NOTHING could be more graceful than the long slender stems and bright Myrtle-like leaves of this perennial climber. When cut for table decoration, or for festooning wreaths, the foliage remains fresh and attractive for a long period.

A warm temperate climate, similar to that of its home at the Cape, is necessary for the welfare of this plant. It is so easily managed in the tropics that the success of Smilax at numerous hill stations is assured. Sandy soil enriched with manure, if watered freely, is suitable. Seed should be sown in pots, from which the seedlings can be planted out without disturbing the roots ; any period of the year will answer.

In cool regions it is advisable to sow early in the growing season in the best soil at command. But the time of sowing is of less importance than the temperature.

SOLANUM

SOME of the shrubby Solanums are grown for the bright colour of their fruits, others for the ornamental character of their foliage. The plants are used for enlivening the conservatory, decorating the table, and also as sub-tropical bedders. As a rule they thrive in warm climates which are not excessively moist. In fact, a sunny position suits all but *S. Capsicastrum*, which does not bear heat well, and some means of shading this variety is necessary. Seed may be sown in pans or on beds, the seedlings to be transplanted when ready; or the sowing can be made where the plants are to stand.

In temperate climates seed must be started on a hot-bed ; later on transfer to a cool frame. When the weather becomes warmer, the plants should be put out on a bed of rich soil, where they can enjoy the free air and sunshine. Those grown for berries will, of course, be potted for use indoors.

As an example it may be stated that in Canada the sowing time is April, affording the aid of a seed protector for a few weeks; or seed is sown in pots placed on a hot-bed, taking care to harden the plants while quite young. The temperature of Egypt and South America appears to suit Solanums thoroughly. Several sowings are made from September until March, where the plants are wanted; if necessary some form of protection is given during the coldest weather.

SPHENOGYNE SPECIOSA

A VERY showy hardy annual, with bright orange- or lemon-coloured heads of flowers, resembling the Marguerite in form. The culture usual with hardy annuals will suffice; seed is sown in beds or borders at the opening of the season on ordinary garden soil. Height one foot.

STATICE

THREE most interesting species of Statice are cultivated in gardens from seed. The flowers are of service for indoor decoration immediately they are cut, and they can be preserved for use in winter. The plants flourish on soil impregnated with salt, although salt is not essential to their existence.

S. incana, Silver Cloud, is an elegant perennial for the border. The branching stems carry innumerable small pearly-white flowers, which give the plant a cloud-like appearance; these branches are extremely useful for bouquets or for winter decoration of vases. *S. spicata* is a dwarf hardy annual, producing long spikes of puce-coloured flowers. *S. Suworowi* has branching rose-coloured spikes of bloom, very effective in borders. These varieties thrive in the cooler parts of South Africa, Australia, Persia, and in temperate regions generally. Seed should be sown thinly on borders during spring, and protection will be necessary in cold or wet weather. Sowings in summer produce plants which bloom in the following year.

STOCK

COPYRIGHT S. & S.

AMONG popular garden flowers grown from seeds, the Stock almost rivals the Aster in diversity of form and extensive range of colour. Single blossoms are considered worthless, fit only for destruction immediately their character is revealed. Yet the doubles produce no seed, and the means by which seed is saved from single heads, which may be relied on to produce a high percentage of handsome double spikes, constitutes one of the deeply interesting floricultural arts.

Three distinct classes are recognised: the Annual or Ten-week varieties, including the pyramidal forms; the Intermediate class, adapted for pot culture and largely used for house and window decoration in spring; and the biennial

Brompton Stocks, which produce the remarkable spikes seen in northern temperate climates during May and June. Of these classes, Annual Stocks take priority in number and usefulness in the garden.

YRIGHT S. & S.

Annual Stocks are not quite hardy. In countries subject to cold nights in spring, early sowings are made under the protection of glass, but only sufficient heat is required to keep frost at bay. A month or six weeks later, seed may safely be entrusted to open beds; from these sowings, however, the flowering is rather late, but the plants are generally robust, because they suffer no check. Pans or shallow boxes, filled with sweet sandy soil, make the best of seed-beds. The seed should be sown thinly in rows, and from the beginning there must be no crowding. While quite small, prick off the seedlings two inches apart, if possible on a spent hot-bed covered by a frame; the glass to be only a few inches above the plants. This tends to keep them stocky. When transferring to flowering positions, the soil should not be stripped from the roots. A few plants ought to be reserved for filling blanks caused by the removal of singles.

Intermediate Stocks.—Seeds are sown in autumn, a few in each pot of moderate size, and the seedlings are thinned down to three. The pots are plunged in ashes under a frame until spring; when taken out a top-dressing of rich soil is beneficial. Seed may also be sown in spring for autumn flowering.

Brompton Stocks.—The most satisfactory method is to sow in seed-pans about midsummer. When the plants are an inch high, expose them for a week before transplanting, and if growth is too free, check them by another transfer. For specially unfavourable districts, potting separately may be necessary; these are turned into borders in spring. That Brompton Stocks can easily be managed in a cold climate is proved by the magnificent spikes grown in Scotland.

Stocks thrive in Australia, New Zealand, and South Africa, where sowings are made in both spring and autumn. In northern temperate countries the practice already described answers well. On the high lands of the tropics, visited by touches of frost, down to a level where the temperature is much warmer, Brompton and Intermediate Stocks have long been favourite flowers; and in numberless districts of hot countries there is no reason why the annual varieties should not increase the pleasures of the garden and the bungalow.

STREPTOCARPUS

ALL the species of Streptocarpus are natives of tropical Africa. The hybrid varieties, obtained a few years ago by cross-fertilisation and selection, speedily became popular in England as greenhouse perennials. They are far superior to the parent plants, and will doubtless win favour in the upland districts of the torrid zone, where it is easy to grow them from seed. These hybrids produce a continuous succession of large trumpet-shaped flowers of many beautiful colours, including pure white, rose, red, lavender, violet, and rosy-purple. At high altitudes in the tropics March or April is the time for sowing; lower down in August or September.

In northern temperate climates seed is sown from January to March in well-drained pots. These are kept in a warm house of 60° to 65° F. (15° to 18° C.), and the soil is never allowed to become dry. When large enough the seedlings are pricked off and subsequently transferred to single pots, maintaining the temperature named. For southern latitudes the corresponding period of the year must be chosen for sowing, and the treatment of a greenhouse perennial is necessary.

S. Wendlandii is a remarkable plant. Only one immense leaf is produced, which is reflexed over the pot and frequently attains a width of two feet, with a proportionate length. From the axis of the leaf, scapes are thrown up to a height of eighteen inches, bearing elegant violet-blue and white flowers. This plant may be grown under the same conditions as Hybrid Streptocarpus.

SUNFLOWER

THE genus *Helianthus* includes about fifty species, nearly all derived from North America, but some of them are natives of Chili and Peru. The cultivated varieties are all hardy, and one of the largest single flowers has long been extensively grown for commercial purposes on the hot plains of Russia. As a garden ornament the Sunflower has a wide range of usefulness, and a number of different types augment its value. Some varieties have a single stem, others are freely branched; the double and single flowers, varying in colour from primrose to deep orange, offer a sufficient diversity to meet all requirements. The height also varies from twelve inches to ten feet. Any good soil is suitable, but a clay loam, heavily manured, produces the most robust growth and the finest heads of bloom. Sunflowers are occasionally grown in rows to form a screen, but the flowers show to greatest advantage in the garden when set in groups, with a background of foliage to throw the yellow discs into relief. In countries subject to the south-west monsoon, August is the month for sowing seed; March and April for Egypt; September for South Africa, Southern and Western Australia, and the tropical and temperate regions of South America; April or May suits Canada and the Northern United States.

COPYRIGHT B. & L

SUNFLOWER, DOUBLE AND SINGLE

SWAN RIVER DAISY

BOTANICALLY this flower is known as *Brachycome iberidifolia*, but the popular name, Swan River Daisy, reveals both the home and the character of this bright herbaceous annual. There are three distinct colours, blue, white, and rose, all charming in beds and mixed borders. The flowers resemble small Cinerarias and are produced in great profusion. From early sowings under shelter, followed by sowings in the open, a prolonged display can be maintained through the summer and autumn. The height is only about nine inches.

In tropical countries having a light rainfall, August is generally the month for putting in seed ; but where the rainfall is heavy, November is preferable. The plant is capable of enduring both cold and heat, but it does not thrive under excessive rain.

SWEET PEA

THE history of the Sweet Pea (*Lathyrus odoratus*) is almost, but not quite, as fascinating as an exhibition of the flowers. The literature on the subject affords an interesting record, extending back for more than two hundred years, of the enthusiastic labour of specialists in augmenting one of the most innocent pleasures of life. An engraved illustration, coloured by hand in 1730, represents the Sicilian Sweet Pea as a loose ill-formed flower, greyish purple in colour. Late in the eighteenth century, five varieties were in existence—black, purple, red, white, and the Painted Lady, showing that selection had made some progress. In 1837, seed of striped, and a so-called yellow, were also offered. But the closing decades of the nineteenth century witnessed the accession of many splendid novelties, which created deep public interest,

COPYRIGHT B. & B.

and gave the Sweet Pea an important position in the horticultural world.

Among the large number of named Sweet Peas now in existence, some close resemblances are almost inevitable, arising from simultaneous introductions by experts who had been working on similar lines. For practical purposes, however, a judicious selection of fifty or sixty varieties should include the most distinct and beautiful flowers yet raised; of these the Giant-flowered class is most conspicuous. An attempt to describe the colours would be mere waste of language. To appreciate the marvellous gradations of delicate tints, the different varieties must be seen growing side by side. But two points are worth mentioning—the increase in the size of the blossoms, and the profuse habit of the plants. Formerly a stem seldom carried more than two flowers; now three, and even four, are usual.

The constitution of the Sweet Pea is thoroughly hardy. In countries subject to cold winters, seed is freely sown in autumn, and the display in the following spring is generally the finest of the year. But several sowings are also made during spring and summer for maintaining a succession until winter sets in. Rows or clumps are also grown on reserve plots for cutting, and it is worthy of note that Sweet Peas possess ideal qualities for this purpose—long, firm, slender foot-stalks, graceful carriage, and delicious fragrance. Some means must be adopted to protect the seed from feathered foes and ground vermin. Perhaps it would be easier to say where this flower should not be grown, instead of attempting to name the countries that are suitable. In every land where it is possible for white men to live by labour, there is no difficulty in cultivating Sweet Peas, although in some regions protection for the early sowings may save disappointment.

SWEET ROCKET

A SPRING-FLOWERING, sweet-scented hardy perennial, the flowers resembling those of Honesty. The ordinary Rocket grows two feet high, but a very beautiful dwarf white variety attains only half that height; the latter not only comes into flower very early, but the plants are compact and bloom profusely. In warm and temperate climates Sweet Rocket thrives in any good garden soil. Seed may be sown in both spring and autumn, and the seedlings should have one transfer, four inches apart, before the final planting.

SWEET SULTAN

A REMARKABLY beautiful hardy annual, of especial value in temperate climates; but the plant also does fairly well in the tropics at an elevation of 2,000 feet. It is usual to sow in August on a bed liberally enriched with leaf-mould. When ready the seedlings must be planted out in deep friable soil, giving them the advantage of a cool position. In temperate latitudes, seed is sown in the open during spring, and the plants are thinned to a few inches apart. The colours are white, blue, purple, and yellow, all delightfully fragrant. When cut the flowers retain their freshness in water for some days.

SWEET WILLIAM

THE Sweet William is a very handsome biennial, and belongs to the same genus as the Pink. The finest strains produce superb heads of bloom, some of them intensely rich in colour; others have a contrasting edge.

Several of the biennials and perennials are amenable to the treatment of annuals, and are none the worse for it. Not so with this flower. Any interference with its natural habit is injurious, and this fact necessarily restricts the range of cultivation. But in all countries which have a dormant season the Sweet William should prove a valuable accession. It is essentially a denizen of the garden, and perfectly hardy.

COPYRIGHT S. & S.

COPYRIGHT S. & S.

Seed is sown about midsummer, the seedlings are pricked off from four to six inches apart until autumn, and before cold weather sets in they are planted in beds or borders for flowering in the following year.

TAGETES

For their floriferous habit and long duration of bloom, two of the Mexican single Tagetes are of great value in the garden, especially late in summer. *T. lucida* has glossy green foliage and sweet-scented yellow flowers, eighteen inches high. *T. signata pumila* is less tall, and makes an admirable autumn bedding plant, with its great profusion of bright yellow flowers. Both are hardy annuals, easily grown from seed in warm and temperate climates. The culture is the same as for Marigold.

THUNBERGIA

THE smaller species of Thunbergia are elegant greenhouse climbers, suitable for dwarf trellises or hanging baskets. They are also planted out in warm sunny positions. *T. alata* has buff-coloured flowers, with black centre. The flowers of *T. alata alba* are pure white, and those of *T. aurantiaca* a very attractive bright orange. These grow freely in tropical gardens from sowings made at the beginning of the growing season. In cool climates it is necessary to sow in pots under glass, and the seedlings are potted separately when ready. A good mixture of soil is necessary; loam, leaf-mould, and decayed manure answer well. In the early stage of growth a warm atmosphere is essential to the welfare of Thunbergias.

TORENIA

THREE annual varieties of Torenia are cultivated from seed and make charming greenhouse plants. The colours are white and yellow with purple throat. In warm climates seed can be sown at almost any time on a hot-bed or in a propagating pit. While quite small the seedlings need to be pricked off into pots, and must subsequently be potted separately in a mixture of leaf-mould and loam. This flower makes an excellent companion for *Impatiens Sultani.* Green-fly is often a very troublesome pest.

TROPÆOLUM CANARIENSE

THE well-known Canary Creeper is a popular and elegant climber, with very graceful foliage and canary-yellow flowers.

It is seen to the greatest advantage on trellises, wire arches, the pillars of verandahs, and it forms a most attractive framing to windows. For the purpose last named, however, the plant must not be employed in countries where snakes may use it as a ladder for entering a room. The Canary Creeper needs a rich soil to maintain growth during a long period. As a half-hardy annual it can be grown in all the countries referred to on page 263 under Dwarf Nasturtium.

COPYRIGHT S. & S.

TYDÆA

TYDÆAS are related to the Gesnera, and the two plants thrive under the same treatment. Many very beautiful dwarf hybrids of the former are most valuable greenhouse plants. The flowers vary from white to the richest crimson, and they are often marked with a different colour. The foliage has the charming velvety surface which is a common characteristic of the family. Tydæas are highly popular in the tropics where the rainfall is less than fifty inches. Probably the plants are seen to the greatest advantage in cool conservatories or on verandahs. In the open ground their beauty often escapes attention. The seed, which is minute and needs to be handled with care, may be sown from the beginning to the middle of the monsoon season. The pots should be filled with a compost of loam, leaf-mould, and decayed manure in equal proportions, with sufficient sharp grit or crushed shells to insure drainage. When the surface has been prepared, immerse the pots in water up to the rim for an hour; then sow, cover with a sheet of glass, and place in shade. When germination is visible, raise the glass a little and increase the air space until protection is needless.

In temperate countries Tydæas should be sown early in the season under the conditions that are favourable to Achimenes or Gloxinias. The plants will come into bloom in seven or eight months.

VALERIAN

THE white, pink, and red varieties are admirably suited for rock-work or the wild garden; the large heads of this flower also make a good show in borders. The Valerian is widely distributed through cold northern regions, and has been naturalised in British plantations. It is a hardy perennial; seed is sown in summer, and the plants are put into final positions in autumn. Height two feet.

VENUS'S LOOKING-GLASS

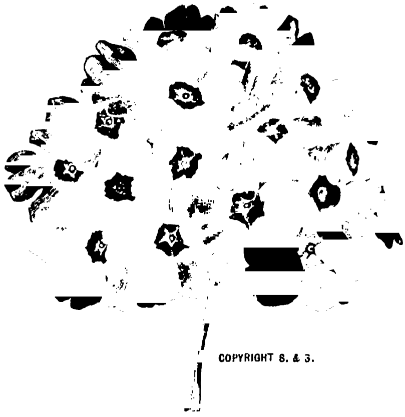
A FREE-FLOWERING hardy annual, having small bell-shaped flowers; specially adapted for temperate climates. Seed may be sown in spring or autumn. The two colours, purple and white, make an excellent contrast. Height nine inches.

VENUS'S NAVEL-WORT

THIS hardy annual, with its silvery foliage and white flowers, grows only nine inches high. It is an attractive little plant worthy of attention in all temperate climates.

VERBENA

THE Verbena, like the Hollyhock, has passed through a crisis. The perpetuation of this plant by cuttings, for a long series of years under artificial conditions, so debilitated its constitution that disease threatened its existence. The intervention of the seed grower really saved the flower. Seedlings were found to possess sufficient vigour to resist the attacks of the deadly Verbena disease. This advantage was accompanied by another—the saving of labour, glass structures, and other expenses incidental to keeping a stock of plants in heat through the winter. The practice of raising Verbenas from seed is now general, and it has brought the flower within reach of thousands who could not touch it under more costly and troublesome conditions.


COPYRIGHT S. & S.

In tropical countries the seed-bed is made in a cool shady situation, and, if possible, protected from heavy rainfall both in the open and under trees. The rain which passes through a thin cocoa-nut-fibre mat, properly stretched, resembles a mist which saturates but does no harm. If the sowing be too thick the seedlings must be thinned ; otherwise they may remain on the bed until ready for planting out. For a few days after the transfer, some form of shading from fierce sunshine must be arranged.

In Egypt and other south Mediterranean countries, seed is sown in a frame from August to January, a thin mat being kept near at hand as protection from the sun. A better arrangement is to fix the mat at a sufficient height above the glass to afford shade without obstructing light and air. The same season and methods are suitable for South Africa, Australia, and temperate South America, with the additional precaution, where the winter is cold, of having a hot-bed under the frame. The only modification necessary for the Argentine Republic is an alteration of the sowing period to February-May.

For northern temperate countries seedlings are raised in heat from January to the beginning of March, and these bloom profusely in the summer and autumn of the same year. During March and April sowings are made in a frame and also on prepared beds for transplanting when ready. Under glass the process is very simple ; pans or boxes are used for sowing ; and from these the seedlings are transferred to separate pots, gradually hardened, and turned out when the bedding season arrives.

Verbena venosa.—An excellent border perennial, remaining in bloom for a long period. It does well as a rock plant, and in the tropics is frequently grown at the foot of a wall. Height six inches.

Verbena pulcherrima is a charming species with rosy-purple flowers, rather smaller than those of the florists' Verbena. In tropical countries it often reappears from self-sown seed. In cool climates seed should be sown in a frame. Height one foot.

VIOLA

A HARDY perennial of immense value for spring bedding. The best modern strains show a considerable advance on those seen in gardens a few years ago. The flowers are smaller than those of the Pansy, but the Viola atones for this by blooming more profusely and for a longer period. The two plants are alike in constitution ; they have the same range of cultivation, and need similar soil and treatment.

COPYRIGHT S. & S.

VIOLET

THE Violet is so universal a favourite that the opportunity of raising plants from seed will be fully appreciated by those in 'the British dominions beyond the seas.' It is a hardy perennial, nearly related to the Viola and the Pansy. Where those flowers thrive, Violets will be successful. But it is only right to state that seed is very slow, sometimes months, in germinating. Under favourable conditions sowings may be made from March

COPYRIGHT S. & S.

to June in warm moist soil. The plants should be bedded in a cold frame through the winter, and they will flower in the spring of the following year. For the tropics this must be regarded as a hill plant. In the southern hemisphere it is quite as easy to grow Violets as in the north. The cultural details suggested under Pansy are also suitable for this flower.

VISCARIA

A PROFUSE-BLOOMING hardy annual, adapted for tropical regions during the cold season. For South Africa, Australia, South America, and Egypt, the sowing months are September and October. In northern latitudes it is usual to sow in both spring and autumn. The colours are glowing carmine, magenta, pink with purplish eye, and lavender-blue ; all effective in beds and masses.

WALLFLOWER

THE bright gold and rich crimson-brown colours of the Wallflower are employed with splendid effect on the parterres of noble mansions, and the flower is invariably found in the gardens of cottagers. The accession, during recent years, of several remarkably handsome strains has enhanced the value of both single and double Wallflowers for bedding and general decorative purposes.

Nothing can be gained by attempting to interfere with the habit of biennial Wallflowers. The practice of sowing about midsummer is best for the plants and most suitable for the garden. In temperate climates two or three sowings may be made at short intervals on a sunny border, beginning in May and ending in July. While small the seedlings should be pricked off in a bed of friable soil, and it will be an advantage when preparing this bed to dress it freely with lime. As the seedlings develop, lift every other row, and every alternate plant in the rows that remain, and transplant to a new bed six inches apart. Before winter sets in the plants are to be put in flowering quarters.

A cool climate suits the Wallflower, but it is successfully grown in the tropics at altitudes varying from 3,000 to 7,000 feet. In the southern hemisphere, the same rules are followed as in northern latitudes.

Early Flowering Varieties.—By selection and cross-fertilisation a new race of Wallflowers has been obtained, and it is now possible to enjoy almost throughout the year a fragrance which has hitherto been associated exclusively with spring. The variety known as All the Year Round flowers four months after sowing, giving a succession of bloom which lasts until checked by frost, or by exhaustion if allowed to seed. When this is prevented by removal of the seed stems, the plants burst again into bloom with renewed vigour after any temporary enforced rest. Sutton's Phœnix is not quite so precocious as the variety just referred to, but it is still very much earlier than biennial kinds, and it

COPYRIGHT S. & S.

offers the additional advantage of rich blood-red blossoms at a time when highly coloured flowers are particularly acceptable. Both varieties are of great value in countries where biennial Wallflowers cannot be grown on account of the severe winter.

WHITLAVIA

CALIFORNIA has contributed a considerable number of hardy annuals for the adornment of gardens, and of these Whitlavia is one of the most useful. The pretty bell-shaped flowers somewhat resemble a Gloxinia in miniature ; colour blue with white throat. There is also a violet-flowered variety. In Australia and South Africa the Whitlavia has proved a great success, and it thrives in all temperate climates. Seed is sown in spring in the open ground. Height one foot.

WINTER CHERRY

THE Winter Cherry is extensively employed for winter decoration in association with the silvery Honesty, dried grasses, and various everlasting flowers. The enlarged calyx takes the form of a very handsome pod, which frequently measures three inches in depth ; colour a glowing orange-scarlet, very distinct and effective. On the plant these pods present the appearance of small fire balloons.

Winter Cherry is a perennial and quite hardy; but in temperate latitudes, if treated as an annual by sowing seed before the spring is far advanced, the plants will flower and fruit in the same year.

In northern tropical countries this plant may be raised, where the rainfall is moderate, by sowing from August to November on a bed of very rich soil. While small the seedlings must be transplanted, three inches apart, in another bed. Immediately the rows appear crowded remove to borders allowing a space of twelve to fifteen inches. A number of plants should be potted for use indoors, and whether in beds or pots they occasionally need the stimulus of liquid manure until the flowers appear. Height two feet.

XERANTHEMUM

As a native of Eastern Europe and the Mediterranean region, this hardy annual naturally thrives with but little care in warm temperate countries. Seed is sown during spring in the open ground. In South Africa, Australia, and New Zealand sowings are made in both spring and autumn. For the hot climates north of the Equator, the sowing period extends from August to November. The flowers are double, rich in colour, very handsome while growing, and as true Everlastings they are a valuable addition to floral resources for winter decoration of the house.

ZINNIA

In horticulture the term 'hardy' is constantly used in relation to cold, but it may with accuracy be said that the Zinnia is hardy in withstanding heat. This flower has, therefore, a special value for warm and tropical countries. The culture in open beds is extremely easy where the temperature is high, but the plant succumbs almost as readily under excessive rain as it does under the touch of frost. The sowing season, where the rainfall is moderate in the tropics, is at the beginning of wet weather ; but where the register indicates fifty inches or more, it is useless to sow until at least half the rainy season has passed.

In the warm districts of South Africa, South America, and Australia, sowings are made in open borders from September to November. In Egypt and other countries having a similar temperature, seed is sown in spring, on the understanding that exposure on cold nights means ruin.

COPYRIGHT S. & S.
DOUBLE ZINNIA

Further north the Zinnia must have the treatment of a somewhat tender annual. Seed should be sown towards the end of March, in pots filled with rich fine soil, thoroughly drained, and plunged in a temperature of about 60° F. (15° C.). The seedlings rise quickly ; when an inch high they must be transferred to separate pots, placed in a close shaded frame for a few days, admitting air gradually until hardened. It will seldom be safe to plant out until the beginning of June, unless the position is exceptionally sheltered and the soil very dry.

COPYRIGHT S. & S.
SINGLE ZINNIA

Zinnias do not transplant well except in the young stage.

When it is attempted, water freely and lift with extreme care to avoid breaking the roots; after the transfer shade each plant from the sun for a few days. As the large double flowers are heavy the support of stakes will be necessary; even the branches may have to be tied out to save them from destruction by a moderate wind.

COPYRIGHT S. & S.

INDEX

PAGE
Abronia umbellata . . . 133
Abutilon 133
Acacia 135
Achimenes 136
Acroclinium 137
African Marigold . . . 254
Agaricus campestris . . 75
Ageratum 137
Agrostemma 138
Allium Cepa 79
— Porrum 66
— Schœnoprasum . . 62
Alonsoa 139
Alpine Strawberry . . 104
Alstrœmeria 139
Alyssum 140
Amaranthus 141
Amaryllis 143
Ammobium 146
Anagallis grandiflora . . 146
Anchusa 147
Anemone 147
Angelica 61
— Archangelica . . . 61
Animated Oats . . . 229
Annual Chrysanthemum . 183
— Stock 302
Anthriscus Cerefolium . . 62
Antirrhinum 148
Apium graveolens . . . 45
Aquilegia 149
Arabis alpina 150
Armeria 151

PAGE
Artichoke, Globe 1
— Jerusalem 3
Asparagus . . . 5, 151
Asperula 152
Aster 153
— Perennial 258
Aubrietia 157
Auricula 157
Australian Oak . . . 230
Avena sterilis 229

Balm 61
Balsam 159
— Sultan's 240
Bartonia aurea . . . 161
Basil, Bush 61
— Sweet 61
Bean, Broad 9
— Climbing French . . 14
— Dwarf French . . . 11
— Kidney 11
— Runner 15
Bedding Calceolaria . . 172
Beet, Garden 17
— Silver 20
— Spinach 102
Begonia, Fibrous-rooted . 166
— Tuberous-rooted . . 161
Beta Cicla 102
— vulgaris 17
Blue Gum Tree . . . 211
Borage 62

PAGE
Borago officinalis . . . 62
Borecole 21
Brachycome iberidifolia . 306
Brassica oleracea acephala . 21
— — botrytis asparagoides . 23
— — — cauliflora . . 42
— — bullata . . . 34
— — — gemmifera . . 26
— — capitata . . . 27
— — Caulo-rapa . . . 64
— Rapa 109
Bridal Wreath . . . 214
Briza maxima . . . 229
Broad Bean 9
Broccoli 23
Brompton Stock . . . 303
Broom 166
Browallia 166
Brussels Sprouts . . . 26
Bush Basil 61

Cabbage 27
— Lettuce 70
— Portugal 33
— Red 33
— Savoy 34
Cacalia coccinea . . . 167
Calandrinia 168
Calceolaria 169
— Bedding 172
Calendula . . . 63, 255
Calliopsis 195
Callirhoe digitata . . . 172
Campanula 173
Canary Creeper . . . 311
Candytuft 175
Canna 176
Canterbury Bells . . . 173
Capsicum 36
— annuum 36
— baccatum 36
Cardoon 37
Carnation 178
Carrot 38
Carum Petroselinum . . 63

PAGE
Castor-oil Plant . . . 289
Catananche 180
Catchfly 298
Cauliflower 42
Celeriac 48
Celery 45
Celosia plumosa . . . 180
Centaurea . . . 181, 196
Centranthus 181
Cerastium 182
Chamæpeuce 182
Chards 3
Chelone barbata . . . 183
Chemistry of Garden Crops . 122
Cherry Pie 233
Chervil, Curled . . . 62
Chicory 48
Chili 36
Chinese Primula . . . 284
Chives 62
Christmas Rose . . . 234
Chrysanthemum . . . 183
— Annual 183
— Japanese 185
— Perennial 185
Cichorium Endivia . . 59
— Intybus 48
Cineraria 186
— acanthifolia . . . 189
— maritima 189
— Star 187
Clarkia 189
Clerodendron fallax . . 190
Clianthus Dampieri . . 190
Climbing French Bean . . 14
Cobæa scandens . . . 191
Cockscomb 192
— Feathered 180
Coleus 193
Collinsia 193
Columbine 149
Commelina cœlestis . . 194
Convolvulus 194
Coreopsis 195
Cornflower 196
Corn Salad 50

PAGE
Cos Lettuce 68
Cosmea bipinnata . . . 197
Cosmos 197
Couve Tronchuda . . . 33
Cowslip 198
Crambe maritima . . . 99
Cress 50
— Water 51
Crops, Chemistry of Garden 122
— Rotation of Vegetable . 116
Crucianella stylosa . . 199
Cucumber, Frame . . . 52
— Ridge 55
Cucumis Melo 72
— sativus 52
Cucurbita Pepo ovifera . . 113
Cuphea 199
Curled Chervil . . . 62
Cyclamen 200
Cynara Cardunculus . . 37
— Scolymus 1
Cyperus alternifolius . . 202
Cytisus albus 166

Dahlia 202
Daisy, Double 204
— Paris 185
— Swan River 306
Dandelion 56
Datura 204
Daucus Carota 38
Delphinium 205
Dianthus 206
Digitalis 208
Dwarf Bean 11

Eccremocarpus scaber . . 208
Echinops ritro . . . 209
Edelweiss 209
Egg Plant 57
Endive 59
Eragrostis elegans . . . 229
Eryngium planum . . . 210
Erysimum 210

PAGE
Eschscholtzia 211
Eucalyptus 211
Eulalia japonica variegata . 212
Eutoca viscida 213
Evening Primrose . . . 268
Everlasting Pea 244
Exacum affine 213

Faba vulgaris 9
Fairy Rose 290
Feather Grass 230
Fennel 62
Fern 213
Feverfew 214
Fibrous-rooted Begonia . 166
Fish-bone Thistle . . . 182
Fœniculum vulgare . . 62
Forget-me-not 261
Foxglove 208
Fragaria 103
Frame Cucumber . . . 52
Francoa ramosa . . . 214
Fraxinella 215
Freesia 215
French Bean 11
— Honeysuckle . . . 217
— Marigold 254
— Sorrel 64
Fuchsia 217

Gaillardia 218
Garden Beet 17
— Crops, Chemistry of . . 122
— Pea 84
— Turnip 109
Gentiana acaulis . . . 219
Geranium 219
Gesnera 220
Geum 220
Giant Thrift 151
Gilia 221
Gladiolus 221
Glaucium 223
Globe Amaranth . . . 223

PAGE
Globe Artichoke 1
— Thistle 209
Glory Pea of Australia . . 190
Gloxinia. 223
Godetia. 227
Golden Feather . . . 228
Grasses, Ornamental . . 229
Grevillea robusta . . . 230
Gynerium argenteum . . 231
Gypsophila 231

Hare's Tail Grass . . . 229
Hawkweed 232
Helianthus 304
— tuberosus 3
Helichrysum 232
Heliotrope 233
Helleborus niger . . . 234
Herbs 60
Heuchera sanguinea . . 234
Hibiscus 235
Hieracium 232
Hollyhock 236
Honesty 237
Honeysuckle, French . . 217
Hop, Annual 239
Hordeum jubatum . . . 229
Horehound 62
Horned Poppy 223
Humea elegans . . . 238
Humulus 239
Hyssop 62
Hyssopus officinalis . . 62

Iberis 239
Ice Plant 240
Impatiens Balsamina . . 159
— Sultani 240
Indian Corn 71
— Pink 206
— Shot 176
Intermediate Stock . . 303
Ipomœa purpurea . . . 194
Isolepis gracilis . . . 241

PAGE
Jacobea, Double . . . 241
Japan Pink 206
Japanese Chrysanthemum . 185
— Primrose 287
— Rose. 291
— Zebra Grass . . . 212
Jerusalem Artichoke . . 3

Kale 21
Kaulfussia amelloides . . 242
Kerosene emulsion . . 20
Kidney Bean 11
Knol Kohl 64
Kohl Rabi 64

Lactuca sativa . . . 68
Lagurus ovatus . . . 229
Lamarckia aurea . . . 229
Lamb's Lettuce . . . 50
Lantana hybrida . . . 242
Larkspur 243
— Perennial 205
Lathyrus latifolius . . . 244
— odoratus 306
Lavandula vera . . . 62
Lavatera 244
Lavender 62, 246
Layia 246
Leek 66
Leontopodium alpinum . . 209
Lepidium sativum . . . 50
Leptosiphon 246
Leptosyne 247
Lettuce, Cabbage . . . 70
— Cos 68
— Lamb's 50
Limnanthes Douglasii . . 247
Linaria 247
Linum 248
Loasa aurantiaca . . . 249
Lobelia 249
— Perennial 250
— Spreading 250
Lophospermum scandens . . 251
Love-in-a-mist . . . 267

PAGE
Love-lies-bleeding 142
Lupinus 251
Lychnis 252
Lycopersicum esculentum 105

Maize 71, 252
Mallow, Tree 244
Malope 253
Malva moschata 253
Marguerite 185
Marigold 254
— African 254
— French 254
— Pot 63, 255
Marjoram, Pot 63
— Sweet Knotted 63
Marrow, Vegetable 113
Marrubium vulgare 62
Marvel of Peru 255
Mathiola bicornis 256
Matricaria eximia 256
Maurandya purpurea grandiflora 256
Melianthus major 257
Melissa officinalis 61
Melon 72
Mesembryanthemum 257
— crystallinum 240
Michaelmas Daisy 258
Mignonette 258
Mimosa 135
Mimulus 259
Mina lobata 260
Mushroom 75
Musk 260
Mustard 78
Myosotis 261
Myrtle 262

Nasturtium 262
— officinale 51
Nemesia strumosa Suttoni 265
Nemophila 266
New Zealand Spinach 102

PAGE
Nicotiana 266
Nigella 267
Night-scented Stock 256
Nycterinia selaginoides 268

Oak, Australian 230
Ocymum Basilicum 61
— minimum 61
Œnothera 268
Onion 79
— Pickling 83
Origanum Marjorana 63
— Onites 63
Ornamental Grasses 229
Oxalis 269

Pampas Grass 231
Pansy 270
Paris Daisy 185
Parsley 63
Parsnip 83
Passion Flower 272
Pastinaca sativa 83
Pea, Everlasting 244
— Garden 84
— Glory, of Australia 190
— Sweet 306
Pelargonium 272
Pennisetum longistylum 230
Pentstemon 273
Perennial Aster 258
— Chrysanthemum 185
— Larkspur 205
Perilla nankinensis 274
Perpetual Spinach 102
Petunia 274
Phacelia 276
Phaseolus multiflorus 15
— vulgaris 11
Phlox Drummondii 277
Pickling Onion 83
Picotee 278
Pink 278
— Indian 206

PAGE
Pink, Japan 206
Pisum sativum 84
Polyanthus 279
Polygonum 280
Poppy 280
— Horned 223
Portugal Cabbage . . . 33
Portulaca 282
Potato 90
— from Seed 93
Potentilla 283
Pot Marigold . . . 63, 255
— Marjoram 63
Primrose 283
— Evening 268
— Japanese 287
Primula 284
— Auricula 157
— Chinese 284
— japonica 287
— obconica 288
— sinensis 284
— Star 286
— stellata 286
Prince's Feather 288
Pyrethrum 288

Quaking Grass 229

Radish 93
Raphanus sativus 93
Red Cabbage 33
Rheum hybridum 95
Rhodanthe 289
Rhubarb 95
Ricinus 289
Ridge Cucumber 55
Rivina humilis 290
Rock Cistus 290
Rosa rugosa 291
Rose Campion 138
— Fairy 290
— Japanese 291
Rosemary 64

PAGE
Rosmarinus officinalis . . . 64
Rotation of Crops in the Vegetable Garden 116
Rudbeckia 291
Rue 64
Rumex scutatus 64
Runner Bean 15
Ruta graveolens 64

Sage 64
Saintpaulia ionantha . . . 291
Salad, Corn 50
Salpiglossis 292
Salsify 98
Salvia 293
— officinalis 64
Sanvitalia procumbens . . . 294
Saponaria 295
Satureia hortensis 64
Savory, Summer 64
Savoy Cabbage 34
Scabious 295
Schizanthus 296
Scorzonera 99
— hispanica 99
Sea Holly 210
— Kale 99
Sedum cæruleum 297
Senecio elegans 241
Sensitive Plant 297
Setaria macrosæta . . . 230
Silene 298
Silver Beet 20
Sinapis alba 78
— nigra 78
Smilax 298
Snapdragon 148
Solanum 299
— esculentum 57
— tuberosum 90
Sorrel 64
— French 64
Sphenogyne speciosa . . . 300
Spinach 101
— Beet 102

PAGE
Spinach, New Zealand . . 102
— Perpetual 102
Spinacia oleracea . . . 101
Sprouts, Brussels . . . 26
Squirrel Tail 229
Star Cineraria 187
— Primula 286
Statice 300
Stipa pennata 230
Stock 301
— Annual 302
— Brompton 303
— Intermediate . . . 303
— Night-scented . . . 256
Strawberry 103
— Alpine 104
Streptocarpus 303
Sultan's Balsam . . . 240
Summer Savory . . . 64
Sunflower 304
Swan River Daisy . . . 306
Sweet Basil 61
— Knotted Marjoram . . 63
— Pea 306
— Rocket 308
— Sultan 309
— William 309

Tagetes 310
Taraxacum officinale . . 56
Tassel Flower 167
Tetragonia expansa . . 102
Thistle, Fish-bone . . . 182
— Globe 209
Thrift, Giant 151
Thunbergia 311
Thyme 64
Thymus vulgaris . . . 64
Tobacco 266

PAGE
Tomato 105
Torenia 311
Tragopogon porrifolius . . 98
Tree Mallow 244
Tropæolum canariense . . 311
— majus 264
— minus 263
Tuberous-rooted Begonia . 161
Turnip 109
Tydæa 312

Valerian 313
Valerianella olitoria . . 50
Vegetable Garden, Rotation of Crops in . . . 116
Vegetable Marrow . . 113
— Oyster 98
Venus's Looking-glass . . 313
— Navel-wort 313
Verbena 314
— pulcherrima . . . 315
— venosa 315
Viola 315
Violet 316
Viscaria 317

Wallflower 317
Water Cress 51
Whitlavia 319
Wind Flower 147
Winter Cherry 319
Woodruff, Sweet . . . 152

Xeranthemum . . . 320

Zea Mays 71
Zebra Grass 212
Zinnia 320

Spottiswoode & Co. Ltd., Printers, New-street Square, London

THE

CULTURE OF VEGETABLES AND FLOWERS

FROM SEEDS AND ROOTS.

COMPILED ESPECIALLY FOR THE TEMPERATE CLIMATES OF THE NORTHERN HEMISPHERE.

BRIEF EXTRACTS FROM REVIEWS.

'The work is one of the best on English Garden management, the thoroughness with which each subject is treated being very noticeable.'—**THE TIMES.**

'A practical and scientific handbook to garden cultivation.' **DAILY TELEGRAPH.**

'The best of guides to the amateur gardener, and full of hints valuable to a professional.'—**THE STANDARD.**

'Both scientifically and practically the work amply justifies its title, and we commend it with confidence to all desiring a reliable work of reference.' **MORNING POST.**

'A treatise by well-known horticulturists, eminently of a practical kind.' **DAILY NEWS.**

'The work is so exhaustive that the skilled gardener will find it helpful in the higher branches of his profession.'—**ST. JAMES'S GAZETTE.**

'A very useful book either for the master of the house himself or for his working gardener.'—**THE FIELD.**

'A very serviceable reminder of what to do and how to do it, and the several articles on the pests of the garden and the chemistry of vegetation will be found of much service.'—**GARDENERS' CHRONICLE.**

'Handsomely printed and usefully illustrated, treating of the whole routine of garden work. The essays on subsidiary subjects tend to promote that true theoretical knowledge which is the basis of all sound practice.' **GARDENERS' MAGAZINE.**

'A volume that will do credit to any library. Every article in the book contains valuable hints beyond the ordinary instructions given in most manuals of the kind.'—**MARK LANE EXPRESS.**

'A volume which will be purchased and prized by many an amateur gardener, who will consider himself fortunate in possessing, in a compendious form, advice and instruction based upon an almost unique experience, and conveyed in an intelligent and pleasing manner.'—**ESTATES' GAZETTE.**

'We have read the book with keen interest, and have found it a sound guide, practical and theoretical, to the pursuit of horticulture. It should be valuable to every horticulturist, whether he grows for pleasure only or for market, the thoroughness with which every detail is treated being its passport to authority and consideration.'—**LAND AND WATER.**

May be obtained direct from SUTTON & SONS, *Reading, England,*
or through all Booksellers, from the Publishers,
SIMPKIN, MARSHALL, HAMILTON, KENT & CO., LIMITED, LONDON.
Price FIVE SHILLINGS.

SUTTON'S SEEDS

OF

THE FINEST VEGETABLES,

AND

THE MOST BEAUTIFUL FLOWERS.

Special Collections to suit the Climate of any part of the world at the following prices:

COLLECTIONS OF

VEGETABLE SEEDS.

£	s.	d.
10	10	0
5	5	0
4	4	0
3	3	0
2	2	0
1	1	0
0	10	6
0	7	6
0	5	0

COLLECTIONS OF

FLOWER SEEDS.

£	s.	d.
5	5	0
4	4	0
3	3	0
2	2	0
1	11	6
1	1	0
0	10	6
0	7	6
0	5	0

The price of each Collection includes an air-tight Case, which will be found useful for many purposes after the Seeds have been sown.

Complete Catalogue of Vegetable and Flower Seeds may be had free on application.

SUTTON & SONS,

Seedsmen to His Majesty King Edward VII.,

READING, ENGLAND.

BOOK ON GRASSES.

Permanent and Temporary Pastures

By MARTIN J. SUTTON.

FIRST DEDICATED BY SPECIAL PERMISSION TO
HIS ROYAL HIGHNESS THE PRINCE OF WALES
When President of the Royal Agricultural Society of England, 1885-6.

Sixth Edition. **Price 5s.** BOUND IN CLOTH.	Completely revised, and substantially bound in cloth. Illustrated with 23 varieties of Natural Grasses and Clovers, and containing 46 Analyses prepared expressly for this work by Dr. J. Augustus Voelcker.
Popular Edition. **Price 1s.** PAPER COVER.	Including all the Chapters contained in the Sixth Edition, but omitting the Illustrations, Analyses, and Index.
Edition de Luxe. **Price 21s.**	Containing the original Coloured Plates, and Dr. Voelcker's Analyses. Bound in cloth, bevelled boards.

From ***THE TIMES.***

'The high place which grass-land management now occupies in connection with our agriculture makes the publication of a revised edition of Mr. Martin J. Sutton's work on grasses and their management an event of more than ordinary importance. The first thing to strike the reader is the handsome character of the volume, more especially with regard to the 23 beautiful plates of grasses and clovers, which are printed in natural colours. As one reads it, however, it soon becomes apparent that it is as complete and modern as it is handsome. The first part deals with the entire question of grass land and its management, and in this we have not only the cream of the best practice in different parts of the country, but the latest statistics and the results of the most modern experiments. The second part deals with the leading grasses and clovers, of which 23 are represented by coloured plates, and two analyses by Dr. J. A. Voelcker. Each is also described botanically and agriculturally, and illustrations are given of the seed, both natural size and enlarged. All interested in the land will be pleased to have such a practical and scientific guide to grass-land culture.'

May be obtained direct from SUTTON & SONS, *Reading, England,*
or through all Booksellers, from the Publishers,
SIMPKIN, MARSHALL, HAMILTON, KENT & CO., LIMITED, LONDON.

SUTTON'S

GRASS AND ROOT SEEDS

FOR THE FARM.

MR. MARTIN SUTTON'S

PRESCRIPTIONS OF

The Best GRASSES and CLOVERS for Permanent Pasture.

The Best GRASSES and CLOVERS for Temporary Pasture.

The Best GRASSES and CLOVERS for 1, 2, or 3 Years' Ley.

Each prescription is prepared to suit the climatic conditions of the country for which it is intended.

PRICES ON APPLICATION.

Sutton's Grasses and Clovers have been sown with great success in Australia, New Zealand, South Africa, North America, South America, in nearly every European country, and in all the counties of the United Kingdom.

SUTTON'S PEDIGREE STOCKS OF MANGEL SEEDS.

SUTTON'S PEDIGREE STOCKS OF SWEDE SEEDS.

SUTTON'S PEDIGREE STOCKS OF TURNIP SEEDS.

Priced Descriptive Catalogue on application.

SUTTON & SONS,

The King's Seedsmen, READING, ENGLAND.